

Figure 4-12: Locations of Congestion for Alternative B

Table 4-22. AM Peak Hour Measures of Effectiveness for Alternative B—Freeway Mainline Segments (1 of 2)

Freeway Segment	Year 2018													Year 2038												
	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	Corsim Served Volumes/ Lanes (vphl)	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	Corsim Served Volumes/ Lanes (vphl)
State Route 99 NB Mainline																										
SR-99 NB south end of the network to White Lane off-ramp	5,050	5,050	100%	50	1	63	20	C	50	4444	70	2	1265	6,945	6,945	100%	51	2	62	28	D	51	6096	99	5	1739
White Lane off-ramp to White Lane loop on-ramp	4,360	4,360	100%	19	1	63	17	B	69	1461	23	1	1090	5,865	5,865	100%	20	1	61	24	C	71	1969	32	2	1470
White Lane loop on-ramp to White Lane diagonal on-ramp	5,985	5,676	95%	7	2	52	28	D	77	597	12	2	1419	7,495	7,133	95%	8	3	46	39	E	79	750	16	5	1783
White Lane diagonal on-ramp to Ming Avenue off-ramp	6,695	6,518	97%	78	6	60	25	C	154	8428	141	11	1449	8,200	8,094	99%	81	8	58	32	D	160	10462	181	19	1619
Ming Avenue off-ramp to C-D (SR 58 WB) off-ramp	5,980	5,980	100%	11	1	61	19	C	166	1143	19	1	1197	7,325	7,325	100%	11	1	61	25	C	171	1417	23	1	1483
SR 58 WB off-ramp to SR 58 EB off-ramp	4,900	4,848	99%	27	1	61	18	B	192	2209	36	2	970	6,055	5,970	99%	27	2	60	22	C	198	2717	45	3	1327
SR 58 EB off-ramp to Ming Avenue on-ramp	3,896	3,896	100%	25	1	63	16	B	217	1695	27	1	977	4,805	4,784	100%	25	1	62	19	C	223	2076	33	1	1196
Ming Avenue on-ramp to SR 58 on-ramp	4,706	4,652	99%	8	0	61	19	C	225	596	10	1	1163	5,755	5,668	98%	8	1	60	23	C	231	725	12	1	1417
SR 58 on-ramp to California Avenue off-ramp	5,701	5,669	99%	39	3	60	23	C	263	3669	61	4	1417	6,855	6,855	100%	40	4	59	28	D	271	4467	76	8	1719
California Avenue off-ramp to California Avenue loop on-ramp	4,751	4,751	100%	16	1	62	19	C	279	1342	22	1	1189	5,755	5,753	100%	16	1	62	23	C	287	1624	26	1	1438
California Avenue loop on-ramp to California Avenue diagonal on-ramp	5,596	5,441	97%	9	1	60	23	C	288	809	14	1	1360	6,815	6,674	98%	9	1	56	30	D	297	992	18	2	1669
California Avenue diagonal on-ramp to Rosedale Highway off-ramp	5,976	5,624	94%	32	2	60	22	C	320	2950	50	3	1250	7,285	6,933	95%	33	4	56	29	D	330	3576	64	7	1541
Rosedale Highway off-ramp to Buck Owens Boulevard/Sillect Avenue off-ramp	4,386	4,211	96%	16	1	62	17	B	337	1197	19	1	1053	5,545	5,454	98%	17	1	61	22	C	347	1550	25	1	1364
Buck Owens Boulevard/Sillect Avenue off-ramp to Buck Owens Boulevard/Sillect Avenue on-ramp	3,832	3,685	96%	24	1	63	15	B	360	1531	24	1	921	4,725	4,646	98%	24	1	62	19	C	371	1931	31	1	1162
Buck Owens Boulevard/Sillect Avenue on-ramp to Airport Drive off-ramp	4,247	4,070	96%	34	2	61	17	B	394	2314	38	2	1018	5,420	5,271	97%	35	4	58	23	C	406	3003	52	6	1318
Airport Drive off-ramp to SR 99 NB north end of the network	2,727	2,587	95%	40	1	63	10	A	434	1827	29	1	647	3,700	3,591	97%	41	1	63	14	B	447	2537	41	1	898
State Route 99 SB Mainline																										
SR 99 SB north end of the network to Airport Drive on-ramp	3,280	3,280	100%	48	1	64	13	B	48	2811	44	1	824	4,025	4,025	100%	48	1	64	16	B	48	3454	54	1	1012
Airport Drive on-ramp to Rosedale Highway off-ramp	4,540	4,522	100%	31	2	62	18	B	79	2409	39	2	1131	5,425	5,425	100%	32	3	60	22	C	80	2947	49	4	1225
Rosedale Highway off-ramp to Rosedale Highway loop on-ramp	3,864	3,864	100%	25	1	63	15	B	104	1670	27	1	971	4,075	4,075	100%	25	1	63	17	B	105	1786	28	1	1038
Rosedale Highway loop on-ramp to Rosedale Highway direct on-ramp	4,799	4,799	100%	10	1	57	18	C	113	733	13	2	1211	5,170	5,170	100%	10	1	55	21	C	115	808	15	2	1334
Rosedale Highway direct on-ramp to California Avenue off-ramp	5,329	5,329	100%	37	3	60	22	C	150	3252	55	4	1337	5,825	5,825	100%	38	5	57	26	C	153	3620	64	8	1494
California Avenue off-ramp to California Avenue on-ramp	4,194	4,173	99%	13	1	62	17	B	163	971	16	1	1043	4,370	4,370	100%	13	1	62	18	B	166	1042	17	1	1120
California Avenue on-ramp to SR 58 EB off-ramp	4,634	4,597	99%	27	1	61	18	B	190	2121	35	2	1021	4,905	4,905	100%	27	2	61	20	C	194	2306	38	2	1250
SR 58 EB off-ramp to Ming Avenue off-ramp	3,849	3,817	99%	28	1	62	15	B	218	1852	30	1	954	3,990	3,990	100%	28	1	62	16	B	222	1960	31	1	1010
Ming Avenue off-ramp to SR 58 WB on-ramp	3,080	3,045	99%	22	1	63	12	B	240	1159	18	0	761	3,150	3,150	100%	22	1	63	13	B	243	1219	19	0	800
SR 58 WB on-ramp to Ming Avenue on-ramp	4,604	4,535	99%	51	2	63	14	B	291	4054	65	2	1008	5,760	5,664	98%	52	2	62	17	B	295	5066	82	4	1259
Ming Avenue on-ramp to White Lane off-ramp	5,099	5,028	99%	60	3	61	20	C	352	5159	84	5	1257	6,535	6,447	99%	63	6	59	26	D	358	6644	113	10	1612
White Lane off-ramp to White Lane loop on-ramp	3,674	3,627	99%	19	1	63	14	B	371	1216	19	1	907	4,835	4,752	98%	19	1	63	19	C	378	1593	25	1	1188
White Lane loop on-ramp to White Lane diagonal on-ramp	3,869	3,813	99%	10	0	63	15	B	380	646	10	0	953	5,075	4,975	98%	10	0	62	20	C	387	842	14	1	1244
White Lane diagonal on-ramp to SR 99 SB south end of the network	4,234	4,029	95%	52	2	63	16	B	432	3644	58	2	1007	5,510	5,243	95%	52	2	62	21	C	440	4743	76	3	1311
State Route 99 NB Collector-Distributor																										
SR 99 NB C-D on-ramp to Westside Parkway C-D off-ramp	2,350	2,350	100%	18	1	53	15	B	26	631	12	0	794	2,635	2,635	100%	18	1	53	17	B	26	732	14	1	1104
State Route 99 SB Collector-Distributor																										
Westside Parkway C-D on-ramp to SR 99 SB C-D on-ramp	1,525	1,499	98%	7	0	47	11	A	15	140	3	0	600	2,610	2,503	96%	7	1	46	18	C	16	233	5	0	1252
<div></div> Bottleneck																										
<div></div> Queue																										

Table 4-22. AM Peak Hour Measures of Effectiveness for Alternative B—Freeway Mainline Segments (2 of 2)

Freeway Segment	Year 2018													Year 2038												
	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	CORSIM Served Volumes/ Lanes (vphl)	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	CORSIM Served Volumes/ Lanes (vphl)
Westside Parkway EB Mainline																										
Westside Parkway west end of the network to West Beltway off-ramp	— NOT APPLICABLE —													2,220	2,220	100%	6	2	47	24	C	6	188	4	1	1147
West Beltway off-ramp to West Beltway loop on-ramp	— NOT APPLICABLE —													1,495	1,468	98%	14	1	61	12	B	20	345	6	0	734
West Beltway loop on-ramp to West Beltway diagonal on-ramp	— NOT APPLICABLE —													2,990	2,956	99%	9	1	61	16	B	29	461	8	0	985
West Beltway diagonal on-ramp to Allen Road off-ramp	1,025	976	95%	83	3	61	7	A	83	1376	23	1	488	3,290	3,233	98%	57	2	62	17	B	86	3181	51	2	1078
Allen Road off-ramp to Allen Road on-ramp	965	944	98%	32	0	65	5	A	115	537	8	0	315	2,915	2,861	98%	33	1	63	15	B	119	1629	26	1	954
Allen Road on-ramp to Calloway Drive off-ramp	2,690	2,680	100%	59	3	62	14	B	174	2717	44	2	893	4,910	4,909	100%	61	5	60	27	D	180	5001	83	6	1636
Calloway Drive off-ramp to Calloway Drive Loop on-ramp	2,190	2,179	99%	25	1	64	11	B	198	944	15	0	726	3,960	3,940	99%	25	1	63	21	C	204	1707	27	1	1313
Calloway Drive loop on-ramp to Calloway Drive diagonal on-ramp	2,940	2,845	97%	11	1	61	16	B	209	539	9	1	948	4,930	4,821	98%	12	1	59	27	D	216	913	15	1	1607
Calloway Drive diagonal on-ramp to Coffee Road off-ramp	4,025	3,971	99%	48	2	62	21	C	258	3303	53	3	1324	6,055	6,018	99%	50	4	60	32	D	266	5013	83	6	2006
Coffee Road off-ramp to Coffee Road loop on-ramp	3,360	3,320	99%	23	1	63	18	B	280	1328	21	1	1107	4,980	4,936	99%	23	1	62	26	D	289	1974	32	1	1645
Coffee Road loop on-ramp to Coffee Road diagonal on-ramp	4,235	4,203	99%	11	0	62	17	B	291	796	13	0	1051	5,970	5,892	99%	11	1	62	24	C	300	1116	18	1	1473
Coffee Road diagonal on-ramp to Mohawk Street off-ramp	4,851	4,803	99%	55	3	61	19	C	347	4511	74	4	1067	7,040	6,691	95%	58	6	59	28	D	358	6323	108	11	1673
Mohawk Street off-ramp to Mohawk Street on-ramp	3,386	3,368	99%	20	1	62	18	C	366	1140	18	1	1123	5,220	4,918	94%	20	1	60	27	D	378	1656	27	2	1639
Mohawk Street on-ramp to Truxtun Avenue off-ramp	3,911	3,901	100%	20	1	61	16	B	386	1320	22	1	1300	5,735	5,422	95%	20	1	60	24	C	398	1832	30	2	1549
Truxtun Avenue off-ramp to SR 99 SB C-D off-ramp (SR 99 SB and Ming Ave)	2,522	2,522	100%	84	2	63	13	B	471	3752	60	1	846	4,135	3,835	93%	86	3	62	21	C	484	5664	91	4	1278
SR 99 SB C-D off-ramp (SR 99 SB and Ming Ave) to H Street off-ramp	1,407	1,407	100%	28	1	63	11	B	498	696	11	0	713	2,095	1,934	92%	28	1	63	15	B	512	941	15	0	967
H Street off-ramp to SR 99 NB and SB on-ramp	972	972	100%	30	1	64	8	A	528	523	8	0	492	1,762	1,625	92%	30	1	63	13	B	542	862	14	0	812
SR 99 NB and SB on-ramp to Chester Avenue on-ramp	2,556	2,556	100%	44	2	63	9	A	573	1996	32	1	737	3,605	3,487	97%	44	2	63	13	B	587	2696	43	1	996
Chester Avenue on-ramp to Union Avenue off-ramp	3,271	3,271	100%	27	1	62	14	B	599	1529	25	1	952	4,600	4,462	97%	27	1	61	18	C	614	2049	33	2	1275
Union Avenue off-ramp to Union Avenue loop on-ramp	2,566	2,566	100%	17	0	63	14	B	616	766	12	0	880	3,580	3,456	97%	17	1	63	18	C	630	1004	16	1	1152
Union Avenue loop on-ramp to Union Avenue diagonal on-ramp	2,860	2,860	100%	8	0	62	15	B	624	404	6	0	961	3,905	3,705	95%	8	0	62	20	C	639	519	8	0	1235
Union Avenue diagonal on-ramp to Cottonwood Road off-ramp	3,190	3,190	100%	31	1	62	17	B	655	1708	27	1	1072	4,235	4,032	95%	31	2	62	22	C	670	2142	35	2	1344
Cottonwood Road off-ramp to Cottonwood Road on-ramp	2,755	2,738	99%	28	1	63	14	B	682	1324	21	1	913	3,600	3,413	95%	28	1	63	18	C	697	1650	26	1	1138
Cottonwood Road on-ramp to SR 58 east end of the network	3,030	3,024	100%	25	1	63	16	B	707	1319	21	1	1008	3,915	3,717	95%	25	1	63	20	C	722	1622	26	1	1239
Westside Parkway WB Mainline																										
SR 58 east end of the network to Cottonwood Road off-ramp	3,510	3,510	100%	26	0	64	19	C	26	1605	25	0	1176	5,220	5,220	100%	26	1	63	28	D	26	2387	38	1	1750
Cottonwood Road off-ramp to Cottonwood Road on-ramp	3,180	3,159	99%	18	0	63	17	B	43	970	15	0	1053	5,015	5,015	100%	18	1	62	27	D	44	1553	25	1	1686
Cottonwood Road on-ramp to Brundage Lane off-ramp	3,495	3,448	99%	38	1	62	18	C	81	2282	37	1	1149	5,340	5,340	100%	39	3	60	30	D	83	3559	59	4	1795
Brundage Lane off-ramp to Brundage Lane on-ramp	2,800	2,753	98%	17	1	63	15	B	98	812	13	0	918	4,225	4,225	100%	17	1	62	23	C	101	1267	21	1	1431
Brundage Lane on-ramp to Union Avenue on-ramp	3,215	3,117	97%	12	1	62	17	B	110	639	10	0	1039	4,600	4,597	100%	12	1	61	25	C	113	942	15	1	1532
Union Avenue on-ramp to Chester Avenue off-ramp	3,775	3,688	98%	23	1	62	15	B	133	1435	23	1	1054	5,180	5,180	100%	23	1	61	21	C	136	2020	33	2	1484
Chester Avenue off-ramp to H Street on-ramp	2,810	2,724	97%	37	1	63	14	B	170	1773	28	1	908	4,085	4,085	100%	38	2	62	22	C	174	2667	43	2	1365
H Street on-ramp to SR 99 NB off-ramp	3,515	3,364	96%	24	1	62	14	B	195	1401	23	1	961	4,785	4,785	100%	25	1	61	20	C	199	1994	33	2	1369
SR 99 NB off-ramp to SR 99 SB off-ramp	2,520	2,432	97%	21	1	62	13	B	216	887	14	0	811	3,685	3,680	100%	21	1	61	20	C	220	1338	22	1	1227
SR 99 SB off-ramp to SR 99 NB on-ramp	1,515	1,479	98%	28	1	63	12	B	243	723	11	0	740	2,514	2,471	98%	28	1	62	20	C	248	1208	19	1	1235
SR 99 NB on-ramp to Mohawk Street off-ramp	3,055	3,036	99%	67	3	62	16	B	311	3525	57	2	1012	4,199	4,199	100%	69	4	61	23	C	317	4933	81	5	1417
Mohawk Street off-ramp to Truxtun Avenue on-ramp	2,375	2,372	100%	27	1	62	19	C	338	1124	18	1	1186	3,319	3,319	100%	28	2	61	27	D	345	1588	26	1	1677
Truxtun Avenue on-ramp to Mohawk Street loop on-ramp	3,290	3,265	99%	11	1	62	18	B	349	618	10	1	1088	4,339	4,336	100%	11	1	61	24	C	356	821	14	1	1445
Mohawk Street loop on-ramp to Mohawk Street diagonal ramp	3,824	3,790	99%	14	1	63	15	B	363	934	15	1	948	4,994	4,975	100%	14	1	62	20	C	370	1226	20	1	1244
Mohawk Street diagonal ramp to Coffee Road off-ramp	4,304	4,122	96%	42	2	62	15	B	406	3006	49	2	916	5,784	5,521	95%	43	2	61	21	C	413	4026	66	4	1227
Coffee Road off-ramp to Coffee Road loop on-ramp	2,534	2,529	100%	35	1	64	10	A	441	1584	25	0	632	3,609	3,518	97%	36	1	63	14	B	449	2204	35	1	880
Coffee Road loop on ramp to Coffee Road diagonal on-ramp	2,674	2,642	99%	12	0	64	10	A	453	575	9	0	661	3,769	3,657	97%	12	0	63	14	B	462	797	13	0	914
Coffee Road diagonal on-ramp to Calloway Drive diagonal off-ramp	2,924	2,889	99%	48	1	63	11	B	501	2433	38	1	722	4,094	3,892	95%	48	2	63	15	B	510	3267	52	2	973
Calloway Drive diagonal off-ramp to Calloway Drive loop off-ramp	2,249	2,169	96%	11	0	62	9	A	512	411	7	0	542	3,494	3,319	95%	11	0	62	13	B	520	629	10	0	830
Calloway Drive loop off-ramp to Calloway Drive on-ramp	1,304	1,273	98%	24	0	64	7	A	536	544	8	0	424	2,734	2,544	93%	24	1	63	13	B	545	1088	17	0	848
Calloway Drive on-ramp to Allen Road off-ramp	1,629	1,604	98%	57	2	63	8	A	593	1599	25	1	535	3,309	3											

Table 4-23. PM Peak Hour Measures of Effectiveness for Alternative B—Freeway Mainline Segments (1 of 2)

Freeway Segment	Year 2018													Year 2038												
	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	Corsim Served Volumes/ Lanes (vphl)	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	Corsim Served Volumes/ Lanes (vphl)
State Route 99 NB Mainline																										
SR 99 NB south end of the network to White Lane off-ramp	4,630	4,630	100%	50	1	63	18	C	50	4073	64	2	1159	6,695	6,695	100%	51	2	62	27	D	51	5892	95	4	1679
White Lane off-ramp to White Lane loop on-ramp	3,935	3,935	100%	19	1	63	16	B	69	1323	21	1	988	5,600	5,558	99%	20	1	62	23	C	71	1861	30	1	1390
White Lane loop on-ramp to White Lane diagonal on-ramp	5,405	5,162	96%	7	1	57	23	C	76	543	9	1	1291	7,230	6,610	91%	7	2	51	32	D	78	695	14	3	1653
White Lane diagonal on-ramp to Ming Avenue off-ramp	5,989	5,862	98%	77	5	60	22	C	153	7574	126	9	1303	7,905	7,433	94%	79	7	59	29	D	157	9609	164	15	1487
Ming Avenue off-ramp to C-D (SR 58 WB) off-ramp	5,179	5,139	99%	11	0	62	17	B	164	982	16	1	1028	7,045	6,861	97%	11	1	61	23	C	169	1311	21	1	1372
SR 58 WB off-ramp to SR 58 EB off-ramp	4,214	4,125	98%	27	1	62	15	B	191	1883	30	1	825	5,840	5,645	97%	27	1	61	21	C	196	2572	42	2	1254
SR 58 EB off-ramp to Ming Avenue on-ramp	2,979	2,979	100%	25	1	63	12	B	216	1337	21	0	770	4,185	4,106	98%	25	1	63	16	B	221	1781	28	1	1026
Ming Avenue on-ramp to SR 58 on-ramp	3,674	3,674	100%	7	0	62	15	B	223	477	8	0	932	4,960	4,828	97%	8	0	61	20	C	228	618	10	1	1207
SR 58 on-ramp to California Avenue off-ramp	4,513	4,513	100%	38	2	61	18	C	261	2996	49	2	1159	6,055	5,965	99%	39	3	60	24	C	267	3861	64	5	1491
California Avenue off-ramp to California Avenue loop on-ramp	3,898	3,898	100%	16	1	63	16	B	277	1136	18	1	1006	5,371	5,191	97%	16	1	62	21	C	283	1466	24	1	1298
California Avenue loop on-ramp to California Avenue diagonal on-ramp	4,813	4,738	98%	9	1	60	20	C	286	704	12	1	1185	6,740	6,024	89%	9	1	58	26	C	292	896	15	2	1506
California Avenue diagonal on-ramp to Rosedale Highway off-ramp	5,458	5,157	94%	32	2	60	20	C	318	2717	45	3	1146	7,650	6,545	86%	35	5	54	29	D	327	3413	64	10	1454
Rosedale Highway off-ramp to Buck Owens Boulevard/Sillect Avenue off-ramp	3,888	3,712	95%	16	0	63	15	B	334	1054	17	0	928	6,020	5,283	88%	16	1	62	21	C	344	1501	24	1	1321
Buck Owens Boulevard/Sillect Avenue off-ramp to Buck Owens Boulevard/Sillect Avenue on-ramp	3,553	3,402	96%	24	1	63	13	B	358	1414	22	1	851	5,650	4,934	87%	24	1	63	20	C	368	2051	33	1	1234
Buck Owens Boulevard/Sillect Avenue on-ramp to Airport Drive off-ramp	4,284	4,116	96%	34	3	59	17	B	392	2342	39	3	1029	6,425	5,719	89%	34	3	60	24	C	402	3250	54	4	1430
Airport Drive off-ramp to SR 99 NB north end of the network	2,939	2,802	95%	40	1	63	11	B	432	1978	31	1	700	5,020	4,502	90%	41	2	62	18	C	443	3179	51	2	1126
State Route 99 SB Mainline																										
SR 99 SB north end of the network to Airport Drive on-ramp	3,565	3,565	100%	48	1	64	14	B	48	3058	48	1	896	4,740	4,740	100%	48	1	63	19	C	48	4073	64	2	1192
Airport Drive on-ramp to Rosedale Highway off-ramp	5,335	5,335	100%	32	2	60	21	C	80	2867	48	4	1340	6,825	6,825	100%	35	5	56	30	D	83	3750	67	10	1537
Rosedale Highway off-ramp to Rosedale Highway loop on-ramp	4,611	4,611	100%	25	1	62	19	C	105	1996	32	1	1161	5,535	5,535	100%	25	1	61	23	C	108	2428	40	2	1411
Rosedale Highway loop on-ramp to Rosedale Highway diagonal on-ramp	5,921	5,921	100%	10	2	52	25	C	115	910	17	3	1501	6,930	6,930	100%	12	4	44	35	E	121	1070	24	7	1765
Rosedale Highway diagonal on-ramp to California Avenue off-ramp	6,766	6,766	100%	39	5	56	29	D	154	4112	73	10	1696	8,000	8,000	100%	49	15	43	45	F	169	4742	109	33	2014
California Avenue off-ramp to California Avenue on-ramp	5,401	5,374	100%	14	1	62	22	C	168	1251	20	1	1344	6,340	6,323	100%	14	1	60	26	D	183	1472	24	2	1581
California Avenue on-ramp to SR 58 EB off-ramp	6,381	6,296	99%	29	3	58	26	C	196	2909	50	5	1399	7,290	7,175	98%	29	3	57	30	D	212	3315	58	7	1794
SR 58 EB off-ramp to Ming Avenue off-ramp	5,147	5,089	99%	28	1	62	21	C	224	2470	40	2	1272	5,875	5,796	99%	28	1	61	24	C	241	2810	46	2	1449
Ming Avenue off-ramp to SR 58 WB on-ramp	4,057	4,015	99%	22	1	63	16	B	246	1529	24	1	1004	4,750	4,750	100%	22	1	62	19	C	263	1813	29	1	1190
SR 58 WB on-ramp to Ming Avenue on-ramp	6,217	6,168	99%	52	2	62	19	C	298	5513	89	4	1371	7,610	7,551	99%	55	5	59	24	C	317	6755	114	10	1678
Ming Avenue on-ramp to White Lane off-ramp	6,882	6,834	99%	63	6	59	28	D	361	7056	120	12	1709	8,465	8,044	95%	103	45	37	53	F	420	8440	229	101	2011
White Lane off-ramp to White Lane loop on-ramp	4,861	4,821	99%	19	1	63	19	C	381	1616	26	1	1205	6,405	6,075	95%	20	1	61	25	C	440	2036	33	2	1519
White Lane loop on-ramp to White Lane diagonal on-ramp	5,356	5,254	98%	10	1	62	21	C	391	890	14	1	1314	6,945	6,550	94%	10	1	61	27	D	450	1109	18	1	1638
White Lane diagonal on-ramp to SR 99 SB south end of the network	5,806	5,555	96%	53	2	62	22	C	443	5018	81	4	1389	7,570	6,939	92%	53	3	61	28	D	503	6272	103	6	1735
State Route 99 NB Collector-Distributor																										
SR 99 NB C-D on-ramp to Westside Parkway C-D off-ramp	2,110	2,110	100%	18	1	53	13	B	26	570	11	0	717	2,520	2,434	97%	18	1	53	15	B	26	645	12	0	974
State Route 99 SB Collector-Distributor																										
Westside Parkway C-D on-ramp to SR 99 SB C-D on-ramp	2,160	2,160	100%	7	0	47	16	B	15	205	4	0	877	2,860	2,860	100%	8	1	46	22	C	16	269	6	1	1445

Bottleneck

Queue

**Table 4-24. AM Peak Hour Measures of Effectiveness for Alternative B—
Merging/Diverging Conditions**

LOCATION	ANALYSIS TYPE	YEAR 2018			YEAR 2038		
		SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)
State Route 99 NB							
White Lane loop on-ramp	Merging	46	35.6	E	38	52.1	E
White Lane diagonal on-ramp	Merging	53	36.9	E	48	47.7	E
Ming Avenue (from C-D) on-ramp	Merging	59	21.0	C	59	25.0	C
SR 58 on-ramp	Merging	58	25.0	C	54	31.6	D
California Avenue loop on-ramp	Merging	57	28.8	D	53	37.8	E
California Avenue diagonal on-ramp	Merging	57	28.4	D	52	37.7	E
Buck Owens Boulevard/Sillect Avenue on-ramp	Merging	61	17.8	B	59	23.5	C
White Lane off-ramp	Diverging	62	21.4	C	60	31.9	D
Ming Avenue off-ramp	Diverging	60	18.6	B	58	23.0	C
Westside Parkway (C-D) off-ramp	Diverging	61	20.7	C	60	24.9	C
SR 58 EB off-ramp	Diverging	61	15.3	B	61	18.5	B
California Avenue off-ramp	Diverging	59	31.4	D	57	38.6	E
Rosedale Highway off-ramp	Diverging	58	23.1	C	54	29.7	D
Buck Owens Boulevard/Sillect Avenue off-ramp	Diverging	61	19.6	B	59	25.2	C
Airport Drive off-ramp	Diverging	57	24.1	C	51	33.5	D
State Route 99 SB							
Airport Drive on-ramp	Merging	61	22.2	C	59	28.4	D
Rosedale Highway loop on-ramp	Merging	54	22.0	C	51	25.5	C
Rosedale Highway diagonal on-ramp	Merging	59	25.6	C	58	29.5	D
California Avenue on-ramp	Merging	60	23.3	C	59	25.6	C
SR 99 SB C-D on-ramp (Westside Parkway EB and SR 58 WB and H Street)	Merging	62	13.7	B	61	18.1	B
Ming Avenue on-ramp	Merging	59	26.7	C	53	39.5	E
White Lane loop on-ramp	Merging	61	17.5	B	60	22.5	C
White Lane diagonal on-ramp	Merging	61	18.8	B	60	24.1	C
Rosedale Highway off-ramp	Diverging	61	21.1	C	59	28.2	D
California Avenue off-ramp	Diverging	56	33.8	D	54	41.4	E
SR 58 EB off-ramp	Diverging	60	25.4	C	60	27.7	C
SR 99 SB C-D off-ramp (Ming Avenue)	Diverging	61	20.5	C	61	21.4	C
White Lane off-ramp	Diverging	60	21.0	C	58	27.4	C
Westside Parkway/State Route 58 EB							
West Beltway loop on-ramp	Merging	— NOT APPLICABLE —			61	16.2	B
West Beltway diagonal on-ramp	Merging	— NOT APPLICABLE —			62	19.8	B
Allen Road on-ramp	Merging	60	18.9	B	55	34.3	D
Calloway Drive Loop on-ramp	Merging	60	18.8	B	57	30.4	D
Calloway Drive diagonal on-ramp	Merging	60	22.1	C	57	32.1	D
SR 99 NB and SB on-ramp	Merging	63	8.0	A	63	10.6	B
Union Avenue Loop on-ramp	Merging	61	18.0	B	61	22.1	C
Union Avenue diagonal on-ramp	Merging	61	20.7	C	60	25.4	C
Cottonwood Road on-ramp	Merging	61	17.4	B	61	21.0	C
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			47	24.3	C
Allen Road off-ramp	Diverging	65	5.0	A	62	20.2	C
Calloway Drive off-ramp	Diverging	62	18.4	B	60	31.9	D
Coffee Road off-ramp	Diverging	61	26.1	C	60	35.4	E
Mohawk Street off-ramp	Diverging	62	13.6	B	58	29.4	D
SR 99 SB C-D off-ramp (SR 99 SB and Ming Ave)	Diverging	63	11.3	B	61	20.9	C
H Street off-ramp	Diverging	61	20.5	C	63	15.4	B
Cottonwood Road off-ramp	Diverging	60	20.3	C	61	25.0	C
Coffee Road loop on-ramp to Mohawk Street off-ramp	Weaving	60	18.8	B	57	27.7	C
Mohawk Street on-ramp to Truxtun Avenue off-ramp	Weaving	61	15.5	B	56	25.4	D
Chester Avenue on-ramp to Union Avenue off-ramp	Weaving	65	5.0	A	61	20.3	C
Westside Parkway/State Route 58 WB							
Brundage Lane on-ramp (Cottonwood Road)	Merging	62	18.2	B	60	30.3	D
Brundage Lane on-ramp (Union Avenue)	Merging	62	18.3	B	61	26.6	C
SR 99 NB on-ramp	Merging	61	16.6	B	60	23.5	C
Truxtun Avenue on-ramp	Merging	62	17.7	B	61	23.8	C
Mohawk Street loop on-ramp	Merging	62	12.3	B	62	15.6	B
Mohawk Street diagonal on-ramp	Merging	63	12.0	B	62	16.3	B
Coffee Road loop on-ramp	Merging	63	9.5	A	63	13.0	B
Calloway Drive on-ramp	Merging	63	10.2	B	61	18.8	B
Allen Road on-ramp	Merging	63	4.3	A	62	13.9	B
West Beltway loop on-ramp	Merging	— NOT APPLICABLE —			62	10.2	B
West Beltway diagonal on-ramp	Merging	— NOT APPLICABLE —			60	13.0	B
Brundage Lane off-ramp (Cottonwood Road)	Diverging	63	17.5	B	63	26.7	C
Brundage Lane off-ramp (Union Avenue)	Diverging	62	20.3	C	60	32.8	D
SR 99 SB off-ramp	Diverging	62	13.1	B	61	20.1	C
Coffee Road off-ramp	Diverging	61	16.1	B	60	21.2	C
Allen Road off-ramp	Diverging	61	8.6	A	61	20.5	C
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			62	13.0	B
Union Avenue on-ramp to Chester Avenue off-ramp	Weaving	61	16.2	B	60	22.0	C
H Street on-ramp to SR 99 NB off-ramp	Weaving	61	15.1	B	60	20.8	C
SR 99 NB on-ramp to Mohawk Street off-ramp	Weaving	62	16.3	B	61	23.2	C
Coffee Road diagonal on-ramp to Calloway Drive loop off-ramp	Weaving	62	14.5	B	62	15.5	B

Note: Merge/diverge calculations are based on 1,500 feet from on/off ramp. These calculations also include two right most mainline lanes within 1,500 feet.

Table 4-25. PM Peak Hour Measures of Effectiveness for Alternative B—
Merging/Diverging Conditions

LOCATION	ANALYSIS TYPE	YEAR 2018			YEAR 2038		
		SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)
State Route 99 NB							
White Lane loop on-ramp	Merging	54	27.6	C	44	40.2	E
White Lane diagonal on-ramp	Merging	54	33.0	D	50	42.3	E
Ming Avenue (from C-D) on-ramp	Merging	60	17.2	B	60	20.5	C
SR 58 on-ramp	Merging	60	20.6	C	57	25.8	C
California Avenue loop on-ramp	Merging	58	26.2	C	55	32.8	D
California Avenue diagonal on-ramp	Merging	58	27.1	C	48	38.6	E
Buck Owens Boulevard/Sillect Avenue on-ramp	Merging	60	20.1	C	58	26.2	C
White Lane off-ramp	Diverging	63	19.8	B	61	30.9	D
Ming Avenue off-ramp	Diverging	59	17.2	B	59	20.7	C
Westside Parkway (C-D) off-ramp	Diverging	61	18.2	B	60	22.8	C
SR 58 EB off-ramp	Diverging	61	14.1	B	61	18.8	B
California Avenue off-ramp	Diverging	60	25.7	C	59	31.6	D
Rosedale Highway off-ramp	Diverging	59	21.8	C	53	28.0	D
Buck Owens Boulevard/Sillect Avenue off-ramp	Diverging	61	17.4	B	61	22.1	C
Airport Drive off-ramp	Diverging	55	26.4	C	57	31.2	D
State Route 99 SB							
Airport Drive on-ramp	Merging	58	28.8	D	53	40.1	E
Rosedale Highway loop on-ramp	Merging	48	31.5	D	38	43.9	E
Rosedale Highway diagonal on-ramp	Merging	54	35.6	E	37	58.6	F
California Avenue on-ramp	Merging	55	35.0	D	53	36.4	E
SR 99 SB C-D on-ramp (Westside Parkway EB and SR 58 WB and H Street)	Merging	61	18.9	B	60	23.0	C
Ming Avenue on-ramp	Merging	55	37.5	E	35	64.9	F
White Lane loop on-ramp	Merging	59	23.9	C	59	22.3	C
White Lane diagonal on-ramp	Merging	60	25.7	C	60	25.4	C
Rosedale Highway off-ramp	Diverging	60	26.6	C	56	33.5	D
California Avenue off-ramp	Diverging	53	44.2	E	38	64.4	F
SR 58 EB off-ramp	Diverging	58	36.2	E	56	38.3	E
SR 99 SB C-D off-ramp (Ming Avenue)	Diverging	60	27.2	C	60	27.4	C
White Lane off-ramp	Diverging	56	29.5	D	23	63.5	F
Westside Parkway/State Route 58 EB							
West Beltway loop on-ramp	Merging	— NOT APPLICABLE —			61	14.0	B
West Beltway diagonal on-ramp	Merging	— NOT APPLICABLE —			62	17.2	B
Allen Road on-ramp	Merging	61	13.7	B	56	30.5	D
Calloway Drive Loop on-ramp	Merging	61	15.2	B	58	28.6	D
Calloway Drive diagonal on-ramp	Merging	60	18.4	B	55	31.7	D
SR 99 NB and SB on-ramp	Merging	62	9.4	A	62	15.4	B
Union Avenue Loop on-ramp	Merging	60	22.9	C	57	34.2	D
Union Avenue diagonal on-ramp	Merging	61	25.9	C	56	36.6	E
Cottonwood Road on-ramp	Merging	61	23.3	C	60	30.3	D
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			46	23.6	C
Allen Road off-ramp	Diverging	64	4.3	A	62	17.7	B
Calloway Drive off-ramp	Diverging	62	14.1	B	61	28.1	D
Coffee Road off-ramp	Diverging	62	21.7	C	60	34.0	D
SR 99 SB C-D off-ramp (SR 99 SB and Ming Ave)	Diverging	62	15.5	B	60	27.7	C
H Street off-ramp	Diverging	63	10.0	A	62	21.6	C
Cottonwood Road off-ramp	Diverging	61	25.4	C	59	38.8	E
Coffee Road loop on-ramp to Mohawk Street off-ramp	Weaving	60	19.0	B	57	29.1	D
Mohawk Street on-ramp to Truxtun Avenue off-ramp	Weaving	61	18.6	B	58	29.0	D
Chester Avenue on-ramp to Union Avenue off-ramp	Weaving	61	17.9	B	58	27.7	C
Westside Parkway/State Route 58 WB							
Brundage Lane on-ramp (Cottonwood Road)	Merging	62	21.7	C	60	29.0	D
Brundage Lane on-ramp (Union Avenue)	Merging	62	19.7	B	61	26.1	C
SR 99 NB on-ramp	Merging	61	19.3	B	61	23.6	C
Truxtun Avenue on-ramp	Merging	61	22.6	C	60	30.3	D
Mohawk Street loop on-ramp	Merging	62	18.0	B	61	24.6	C
Mohawk Street diagonal on-ramp	Merging	61	17.2	B	59	25.8	C
Coffee Road loop on-ramp	Merging	62	14.6	B	62	21.9	C
Calloway Drive on-ramp	Merging	62	17.1	B	58	32.0	D
Allen Road on-ramp	Merging	63	6.7	A	61	19.5	B
West Beltway loop on-ramp	Merging	— NOT APPLICABLE —			61	14.8	B
West Beltway diagonal on-ramp	Merging	— NOT APPLICABLE —			58	18.6	B
Brundage Lane off-ramp (Cottonwood Road)	Diverging	63	19.4	B	63	25.7	C
Brundage Lane off-ramp (Union Avenue)	Diverging	61	23.8	C	60	31.0	D
SR 99 SB off-ramp	Diverging	62	18.0	B	61	21.0	C
Coffee Road off-ramp	Diverging	60	20.0	C	59	25.3	C
Allen Road off-ramp	Diverging	61	14.2	B	60	24.2	C
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			61	19.4	B
Union Avenue on-ramp to Chester Avenue off-ramp	Weaving	61	18.0	B	60	22.7	C
H Street on-ramp to SR 99 NB off-ramp	Weaving	61	18.4	B	60	21.6	C
SR 99 NB on-ramp to Mohawk Street off-ramp	Weaving	62	19.1	B	61	23.4	C
Coffee Road diagonal on-ramp to Calloway Drive loop off-ramp	Weaving	61	19.4	B	60	26.1	C

Note: Merge/diverge calculations are based on 1,500 feet from on/off ramp. These calculations also include two right most mainline lanes within 1,500 feet.

Table 4-26. AM Peak Hour Measures of Effectiveness for Alternative B—On-Ramp and Off-Ramp Performance (1 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038			
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)
State Route 99 NB Off-ramps								
White Lane	690	684	99%	61	1,080	1,075	100%	59
Ming Avenue	715	666	93%	53	875	869	99%	52
SR 58 WB	1,080	1,069	99%	54	1,270	1,270	100%	54
SR 58 EB	1,005	1,005	100%	54	1,250	1,250	100%	54
California Avenue	950	915	96%	52	1,100	1,100	100%	52
Rosedale Highway	1,590	1,590	100%	53	1,740	1,725	99%	53
Buck Owens Boulevard/Sillect Avenue	555	527	95%	52	820	809	99%	51
Airport Drive	1,520	1,474	97%	51	1,720	1,709	99%	50
State Route 99 NB On-ramps								
White Lane loop	1,625	1,618	100%	42	1,630	1,630	100%	41
White Lane diagonal	710	683	96%	52	705	705	100%	52
Ming Avenue (C-D on)	810	810	100%	50	950	950	100%	51
SR 58	995	938	94%	44	1,100	1,100	100%	43
California Avenue loop	845	776	92%	48	1,060	860	81%	47
California Avenue diagonal	380	327	86%	50	470	383	81%	50
Buck Owens Boulevard/Sillect Avenue	415	400	96%	32	695	640	92%	31
State Route 99 SB Off-ramps								
Rosedale Highway	675	673	100%	54	1,350	1,350	100%	54
California Avenue	1,135	1,135	100%	48	1,455	1,455	100%	35
SR 58 EB	785	782	100%	53	915	915	100%	53
SR 99 SB C-D (Ming Avenue)	770	758	98%	53	840	840	100%	53
White Lane	1,425	1,391	98%	54	1,700	1,699	100%	54
State Route 99 SB On-ramps								
Airport Drive	1,260	1,260	100%	48	1,400	1,400	100%	47
Rosedale Highway loop	935	935	100%	36	1,095	1,095	100%	34
Rosedale Highway diagonal	530	502	95%	40	655	650	99%	40
California Avenue	440	426	97%	51	535	526	98%	51
SR 99 SB C-D (SR 58 WB and H Street)	1,525	1,499	98%	51	2,610	2,494	96%	50
Ming Avenue	495	495	100%	51	775	775	100%	50
White Lane loop	195	191	98%	52	240	240	100%	52
White Lane direct	365	340	93%	53	435	392	90%	53
State Route 99 NB Collector-Distributor Off-/On-ramps								
Ming Avenue C-D on-ramp	1,270	1,270	100%	30	1,365	1,365	100%	28
SR 99 NB C-D on-ramp	1,080	1,069	99%	54	1,270	1,270	100%	54
Westside Parkway C-D off-ramp	1,540	1,540	100%	54	1,685	1,685	100%	54
State Route 99 SB Collector-Distributor Off-/On-ramps								
SR 58 WB on-ramp	1,005	945	94%	39	1,170	1,170	100%	39
Westside Parkway C-D on-ramp	520	520	100%	44	1,440	1,403	97%	44

Table 4-26. AM Peak Hour Measures of Effectiveness for Alternative B—On-Ramp and Off-Ramp Performance (2 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038			
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)
Westside Parkway/State Route 58 EB Off-ramps								
West Beltway	— NOT APPLICABLE —				725	725	100%	51
Allen Road	60	54	90%	53	375	375	100%	54
Calloway Drive	500	498	100%	54	950	950	100%	53
Coffee Road	665	637	96%	54	1,075	1,075	100%	53
Mohawk Street	1,465	1,448	99%	54	1,820	1,759	97%	54
Truxtun Avenue	1,390	1,359	98%	54	1,600	1,573	98%	54
SR 99 SB/Ming Avenue C-D	1,115	1,105	99%	54	2,040	1,990	98%	53
H Street	435	435	100%	54	333	320	96%	54
Union Avenue	705	682	97%	54	1,020	1,004	98%	54
Cottonwood Road	435	435	100%	54	635	612	96%	53
Westside Parkway/State Route 58 EB On-ramps								
West Beltway loop	— NOT APPLICABLE —				1,495	1,488	100%	48
West Beltway diagonal	— NOT APPLICABLE —				300	285	95%	54
Allen Road	1,725	1,725	100%	41	1,995	1,995	100%	44
Calloway Drive loop	750	701	93%	47	970	964	99%	47
Calloway Drive diagonal	1,085	1,071	99%	51	1,125	1,105	98%	51
Coffee Drive loop	875	875	100%	48	990	961	97%	47
Coffee Drive diagonal	615	599	97%	53	1,070	807	75%	53
Mohawk Street	525	525	100%	42	515	512	99%	43
SR 99 NB and SR 99 SB	1,585	1,585	100%	52	1,843	1,843	100%	52
Chester Avenue	715	715	100%	50	995	977	98%	51
Union Avenue loop	295	275	93%	53	325	312	96%	53
Union Avenue diagonal	330	318	96%	52	330	317	96%	52
Cottonwood Road	275	275	100%	52	315	314	100%	52
Westside Parkway/State Route 58 WB Off-ramps								
Cottonwood Road	330	330	100%	54	205	200	98%	55
Brundage Lane	695	695	100%	53	1,115	1,093	98%	42
Chester Avenue	965	965	100%	54	1,095	1,095	100%	54
SR 99 NB	995	936	94%	54	1,100	1,100	100%	54
SR 99 SB	1,005	947	94%	52	1,171	1,171	100%	52
Mohawk Street	680	648	95%	53	880	880	100%	52
Coffee Road	1,770	1,747	99%	53	2,175	2,175	100%	53
Calloway Drive diagonal	675	675	100%	53	600	561	94%	53
Calloway Drive loop	945	895	95%	53	760	760	100%	53
Allen Road	1,065	1,037	97%	51	1,125	1,107	98%	52
West Beltway	— NOT APPLICABLE —				1,485	1,400	94%	54
Westside Parkway/State Route 58 WB On-ramps								
Cottonwood Road	315	295	94%	50	325	325	100%	50
Brundage Lane	415	381	92%	49	375	338	90%	49
Union Avenue	560	554	99%	51	580	580	100%	51
H Street	705	642	91%	51	700	700	100%	50
SR 99 NB/Ming Avenue	1,540	1,540	100%	48	1,685	1,685	100%	46
Truxtun Avenue	915	895	98%	52	1,020	999	98%	51
Mohawk Street loop	535	518	97%	47	655	645	98%	47
Mohawk Street diagonal	480	480	100%	52	790	755	96%	51
Coffee Road loop	140	122	87%	51	160	154	96%	51
Coffee Road diagonal	250	250	100%	54	325	310	95%	54
Calloway Drive	325	325	100%	53	575	552	96%	53
Allen Road	100	100	100%	50	380	371	98%	50
West Beltway loop	— NOT APPLICABLE —				305	305	100%	49
West Beltway direct	— NOT APPLICABLE —				290	286	99%	54
Westside Parkway EB Collector-Distributor Off-/On-ramps								
Westside Parkway EB C-D on-ramp	1,115	1,105	99%	54	2,040	1,890	93%	53
SR 99 SB C-D off-ramp	520	520	100%	49	1,440	1,407	98%	49
SR 99 SB C-D on-ramp	770	759	99%	48	840	840	100%	48

Table 4-27. PM Peak Hour Measures of Effectiveness for Alternative B—On-Ramp and Off-Ramp Performance (1 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038			
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)
State Route 99 NB Off-ramps								
White Lane	695	671	97%	61	1,095	1,095	100%	59
Ming Avenue	810	806	100%	52	860	777	90%	53
SR 58 WB	965	965	100%	54	1,205	1,129	94%	54
SR 58 EB	1,235	1,119	91%	54	1,655	1,634	99%	53
California Avenue	615	607	99%	52	685	685	100%	52
Rosedale Highway	1,570	1,570	100%	54	1,630	1,535	94%	53
Buck Owens Boulevard/Sillect Avenue	335	307	92%	53	370	338	91%	53
Airport Drive	1,345	1,339	100%	50	1,405	1,318	94%	52
State Route 99 NB On-ramps								
White Lane loop	1,470	1,404	96%	44	1,630	1,568	96%	45
White Lane diagonal	585	585	100%	52	675	675	100%	52
Ming Avenue (C-D on)	695	695	100%	52	775	771	99%	51
SR 58	840	840	100%	45	1,095	1,088	99%	43
California Avenue loop	915	790	86%	48	1,370	895	65%	48
California Avenue diagonal	645	486	75%	50	910	677	74%	50
Buck Owens Boulevard/Sillect Avenue	730	727	100%	32	775	775	100%	30
State Route 99 SB Off-ramps								
Rosedale Highway	725	725	100%	54	1,290	1,290	100%	53
California Avenue	1,365	1,365	100%	38	1,660	1,660	100%	29
SR 58 EB	1,235	1,196	97%	53	1,415	1,379	97%	52
SR 99 SB C-D (Ming Avenue)	1,090	1,082	99%	53	1,125	1,100	98%	53
White Lane	2,020	2,009	99%	54	2,060	1,829	89%	9
State Route 99 SB On-ramps								
Airport Drive	1,770	1,770	100%	45	2,085	2,085	100%	41
Rosedale Highway loop	1,310	1,310	100%	34	1,395	1,395	100%	33
Rosedale Highway diagonal	845	793	94%	39	1,070	982	92%	38
California Avenue	980	918	94%	51	950	847	89%	51
SR 99 SB C-D (SR 58 WB and H Street)	2,160	2,160	100%	51	2,860	2,860	100%	49
Ming Avenue	665	665	100%	50	855	855	100%	49
White Lane loop	495	463	94%	51	540	513	95%	52
White Lane direct	450	410	91%	53	625	557	89%	53
State Route 99 NB Collector-Distributor Off-/On-ramps								
Ming Avenue C-D on-ramp	1,145	1,145	100%	33	1,315	1,307	99%	34
SR 99 NB C-D on-ramp	965	965	100%	54	1,205	1,189	99%	54
Westside Parkway C-D off-ramp	1,415	1,415	100%	54	1,745	1,710	98%	53
State Route 99 SB Collector-Distributor Off-/On-ramps								
SR 58 WB on-ramp	1,230	1,208	98%	39	1,220	1,220	100%	39
Westside Parkway C-D on-ramp	930	930	100%	44	1,640	1,639	100%	44

Table 4-27. PM Peak Hour Measures of Effectiveness for Alternative B—On-Ramp and Off-Ramp Performance (2 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038			
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)
Westside Parkway/State Route 58 EB Off-ramps								
West Beltway					865	855	99%	50
Allen Road	90	90	100%	53	300	286	95%	53
Calloway Drive	480	467	97%	54	815	795	98%	53
Coffee Road	575	544	95%	53	875	875	100%	53
Mohawk Street	1,270	1,219	96%	63	1,650	1,572	95%	54
Truxtun Avenue	1,125	1,048	93%	63	1,400	1,379	99%	55
SR 99 SB/Ming Avenue C-D	1,585	1,585	100%	53	2,355	2,313	98%	53
H Street	455	430	95%	54	367	334	91%	54
Union Avenue	755	737	98%	54	1,050	1,050	100%	53
Cottonwood Road	445	418	94%	54	940	920	98%	53
Westside Parkway/State Route 58 EB On-ramps								
West Beltway loop					1,330	1,294	97%	48
West Beltway diagonal					265	265	100%	54
Allen Road	1,285	1,279	100%	46	1,850	1,850	100%	46
Calloway Drive loop	735	714	97%	47	1,010	1,010	100%	47
Calloway Drive diagonal	990	953	96%	52	1,095	1,075	98%	51
Coffee Drive loop	960	948	99%	47	1,050	1,050	100%	47
Coffee Drive diagonal	835	826	99%	53	1,115	1,108	99%	53
Mohawk Street	685	685	100%	43	1,090	1,058	97%	43
SR 99 NB and SR 99 SB	2,235	2,098	94%	52	2,662	2,623	99%	51
Chester Avenue	950	900	95%	51	1,205	1,205	100%	50
Union Avenue loop	550	522	95%	53	635	630	99%	52
Union Avenue diagonal	405	405	100%	52	565	555	98%	52
Cottonwood Road	365	365	100%	52	295	281	95%	52
Westside Parkway/State Route 58 WB Off-ramps								
Cottonwood Road	300	300	100%	54	295	295	100%	54
Brundage Lane	895	832	93%	49	990	974	98%	46
Chester Avenue	880	826	94%	54	1,100	1,065	97%	54
SR 99 NB	840	840	100%	55	1,095	1,089	99%	54
SR 99 SB	1,230	1,213	99%	52	1,220	1,220	100%	52
Mohawk Street	660	653	99%	53	745	697	94%	53
Coffee Road	1,940	1,916	99%	54	2,030	2,000	99%	53
Calloway Drive diagonal	850	847	100%	53	925	925	100%	53
Calloway Drive loop	1,220	1,212	99%	53	1,245	1,186	95%	53
Allen Road	1,825	1,667	91%	54	2,125	1,974	93%	51
West Beltway					2,190	2,093	96%	53
Westside Parkway/State Route 58 WB On-ramps								
Cottonwood Road	460	451	98%	50	520	498	96%	50
Brundage Lane	360	317	88%	49	355	321	90%	49
Union Avenue	720	720	100%	51	750	750	100%	51
H Street	870	870	100%	50	715	715	100%	50
SR 99 NB/Ming Avenue	1,415	1,415	100%	48	1,745	1,660	95%	47
Truxtun Avenue	1,325	1,246	94%	51	1,865	1,836	98%	49
Mohawk Street loop	940	927	99%	47	1,255	1,205	96%	47
Mohawk Street diagonal	620	554	89%	51	990	957	97%	50
Coffee Road loop	250	230	92%	51	280	272	97%	51
Coffee Road diagonal	425	392	92%	54	575	534	93%	54
Calloway Drive	510	510	100%	52	1,015	970	96%	52
Allen Road	70	70	100%	51	435	435	100%	50
West Beltway loop					450	433	96%	48
West Beltway direct					360	348	97%	53
Westside Parkway EB Collector-Distributor Off-/On-ramps								
Westside Parkway EB C-D on-ramp	1,585	1,585	100%	53	2,355	2,313	98%	53
SR 99 SB C-D off-ramp	930	930	100%	49	1,640	1,633	100%	49
SR 99 SB C-D on-ramp	1,090	1,081	99%	47	1,125	1,028	91%	47

Table 4-28. Ramp Termini and Intersection Level of Service for Alternative B (1 of 3)

INTERSECTION	SIGNAL CONTROL	YEAR 2018				YEAR 2038			
		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
		LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)
1. I-5 SB ramps/Stockdale Highway	NB/SB two-way stop	A	3.8	A	8.9	A	5.7	F	69.0
	Imp-Signal*	N/A				B	11.7	B	11.3
2. I-5 NB ramps/Stockdale Highway	NB/SB two-way stop	A	4.4	A	9.3	A	6.1	B	19.9
3. SR 43 (Enos Lane)/Rosedale Highway	4-way stop	B	14.7	D	30.2	D	28.4	F	78.7
	Imp-Signal	N/A				C	26.0	C	32.8
4. SR 43 (Enos Lane)/Stockdale Highway	4-way stop	F	51.5	F	87.0	F	>150	F	>150
	Imp-Signal	C	23.0	C	22.8	B	17.0	C	23.7
5. SR 43 (Enos Lane)/I-5 NB ramps	EB/WB two-way stop	A	4.9	B	10.3	A	3.7	B	14.6
6. SR 43 (Enos Lane)/I-5 SB ramps	EB/WB two-way stop	A	8.0	C	16.2	A	3.9	C	21.9
7. Stockdale Highway/Nord Road	Signal	D	38.5	C	31.0	C	31.8	C	28.2
8. Stockdale Highway/Wegis Avenue	NB/SB two-way stop	A	8.0	B	11.9	F	>150	F	>150
	Imp-Signal*	N/A				C	31.2	C	28.6
9. Stockdale Highway/Heath Road	Stop (existing) Signal (future)	B	16.7	B	19.7	C	25.5	C	26.6
10. Stockdale Highway/Westside Parkway	Signal	A	5.9	B	16.2	A	8.4	A	7.8
11. West Beltway/Westside Parkway WB ramp	Signal	Does not exist in 2018				A	7.4	B	19.5
12. West Beltway/Westside Parkway EB ramp	Signal	Does not exist in 2018				A	8.8	B	13.7
13. Allen Road/Rosedale Highway	Signal*	C	34.2	D	40.4	D	37.5	D	47.7
14. Allen Road/Brimhall Road	Signal	C	23.0	C	32.5	C	23.1	C	33.1
15. Allen Road/Westside Parkway WB ramps	Signal	B	13.9	C	30.2	B	17.2	C	30.1
16. Allen Road/Westside Parkway EB ramps	Signal	B	18.5	A	7.2	B	10.2	B	12.3
17. Allen Road/San Juan Avenue	Signal*	C	23.4	C	20.0	C	22.2	C	25.6
18. Allen Road/Stockdale Highway	Signal	C	25.7	C	27.3	C	30.0	C	33.7
19. Calloway Drive/Rosedale Highway	Signal*	D	43.2	D	38.5	E	55.6	E	60.9
20. Calloway Drive/Brimhall Road	Signal	C	31.8	C	30.0	C	34.9	C	33.2
21. Calloway Drive/Westside Parkway WB ramps	Signal	B	15.1	B	15.3	B	13.1	C	25.6
22. Calloway Drive/Westside Parkway EB ramps	Signal	B	16.5	A	8.3	B	15.9	A	8.9
23. Calloway Drive/Stockdale Highway	Signal	D	46.6	C	30.7	D	44.9	D	38.2
24. Coffee Road/Rosedale Highway*	Signal*	D	45.4	F	108.6	E	67.1	F	135.6

Table 4-28. Ramp Termini and Intersection Level of Service for Alternative B (2 of 3)

INTERSECTION	SIGNAL CONTROL	YEAR 2018				YEAR 2038			
		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
		LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)
25. Coffee Road/Brimhall Road	Signal	C	24.9	C	23.4	C	30.9	C	31.9
26. Coffee Road/Westside Parkway WB ramps	Unsignalized	N/A				N/A			
27. Coffee Road/Westside Parkway EB ramps	Signal	B	17.2	A	9.8	B	18.1	B	14.3
28. Coffee Road/Truxtun Avenue	Signal	B	13.1	B	14.5	B	13.4	B	16.7
29. Coffee Road/Stockdale Highway	Signal*	D	44.0	D	50.5	E	57.1	F	82.8
30. Mohawk Street/Rosedale Highway	Stop (existing)* Signal (future)*	E	60.5	F	154.0	F	84.0	F	108.7
31. Mohawk Street/WSP WB ramps	Signal	A	9.6	A	7.6	B	10.9	A	8.9
32. Mohawk Street/WSP EB ramps	Signal	C	21.8	B	16.9	B	18.3	B	12.3
33. Mohawk Street/Truxtun Avenue	Signal	C	32.6	C	30.6	C	33.6	C	28.8
34. Mohawk Street/California Avenue	Signal*	C	34.1	E	55.4	D	40.6	E	62.4
35. Stockdale Highway/California Avenue	Signal*	D	43.2	E	57.4	D	46.2	E	60.4
36. Airport Drive/State Road–SR 204 off-ramp	Signal	C	20.9	C	23.9	C	21.9	C	26.7
37. Airport Drive/SR 99 NB ramp	Signal	A	8.1	B	10.1	A	9.1	B	12.0
38. Buck Owens Boulevard/Rio Mirada Drive	Signal	C	26.8	C	27.1	C	30.9	C	29.4
39. SR 99 NB ramps/Buck Owens Boulevard	Signal	D	38.3	D	43.0	D	45.3	D	42.3
40. Rosedale Highway/Camino Del Rio Court	Signal	C	21.1	D	40.2	C	33.7	D	45.3
41. Rosedale Highway/SR 99 SB ramps	Signal	B	16.3	B	16.1	C	20.5	C	20.9
42. Rosedale Highway/SR99 NB ramps	Signal	C	23.4	C	30.5	C	24.2	D	36.3
43. 24th Street/Oak Street	Signal	C	30.6	C	30.0	C	33.2	D	39.0
44. Truxtun Avenue/Empire Drive	Signal*	C	34.2	C	30.0	C	26.6	D	52.4
45. Truxtun Avenue/Oak Street	Signal	C	29.2	D	45.7	D	52.7	D	45.3
46. California Avenue/Chester Lane	Signal	C	28.8	D	47.8	C	28.7	F	123.6
47. California Avenue/SR 99 SB ramps	Signal	D	45.5	E	64.6	E	60.1	F	83.2
48. California Avenue/SR 99 NB ramps	Signal	C	28.9	C	28.9	C	28.1	C	21.2
49. California Avenue/Oak Street	Signal	C	25.7	D	40.5	C	27.5	E	57.9
50. Stockdale Highway/Stine Road	Signal*	C	24.9	D	47.8	C	28.7	F	83.8
51. Stockdale Highway/Real Road	Signal	D	42.2	D	39.2	D	42.8	D	50.7
52. Stockdale Highway/SR 99 SB ramp	Signal	Intersection does not exist in Alternative B							

Table 4-28. Ramp Termini and Intersection Level of Service for Alternative B (3 of 3)

INTERSECTION	SIGNAL CONTROL	YEAR 2018				YEAR 2038			
		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
		LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)
53. Brundage Lane/Oak Street	Signal	C	24.5	C	29.9	C	25.3	C	31.4
54. Real Road/SR 58	Signal	Intersection does not exist in Alternative B							
55. Wible Road/SR 99 NB ramps	Signal	Intersection does not exist in Alternative B							
56. Ming Avenue/New Stine Road	Signal*	D	38.6	D	38.8	C	38.0	D	44.6
57. Ming Avenue/Real Road	Signal	C	29.7	C	32.2	C	30.5	C	30.6
58. Ming Avenue/SR 99 SB ramps	Signal	A	6.7	A	5.6	A	7.9	B	15.2
59. Ming Avenue/Wible Road	Signal	B	15.4	C	24.2	C	26.3	C	24.1
60. Ming Avenue/SR 99 NB ramps	Signal	C	28.3	C	32.6	C	27.8	C	34.3
61. Ming Avenue/Castro Lane	Signal	C	28.7	C	34.6	C	28.9	D	36.8
62. White Lane/Wible Road	Signal*	E	61.4	E	72.9	E	78.3	F	136.6
63. White Lane/SR 99 SB ramps	Signal*	C	20.1	F	81.4	C	29.8	F	89.0
64. White Lane/SR 99 NB ramps	Signal*	A	9.0	B	10.3	C	22.7	C	21.4
65. White Lane/Hughes Lane	Signal*	D	38.6	D	44.1	D	40.9	D	53.3
66. H Street/Brundage Lane	Signal	C	25.5	D	51.1	C	26.9	D	47.9
67. H Street/SR 58 WB ramp	Signal	C	24.2	D	46.8	B	13.5	D	36.0
68. H Street/SR 58 EB ramp	Signal	C	21.9	C	21.6	C	24.7	C	27.5
69. H Street/Ming Avenue	Signal*	C	30.0	D	45.2	D	32.9	D	40.9
70. Chester Avenue/Brundage Lane	Signal	C	30.4	D	45.8	C	26.9	D	47.9
71. Chester Avenue/SR 58 WB ramp	Signal	B	18.8	C	23.0	C	20.6	C	27.5
72. Chester Avenue/SR 58 EB ramp	Signal	C	28.8	B	15.1	C	28.6	C	29.1
73. Chester Avenue/Ming Avenue	Signal*	D	37.8	D	49.2	D	39.5	D	52.7
74. Union Avenue/Brundage Lane	Signal	C	31.8	C	26.8	D	45.6	D	49.4
75. Brundage Lane/SR 58 WB ramps	Signal	C	30.9	C	24.6	C	23.6	D	43.4
76. Union Avenue/SR 58 EB ramps	Signal	B	15.4	B	12.7	B	19.8	B	20.0
77. Cottonwood Road–MLK/Brundage Lane	Signal	C	26.3	C	26.7	C	23.6	C	28.9
78. Cottonwood Road–Brundage Lane/SR 58 WB ramps	Signal	C	23.3	C	25.2	C	21.2	C	30.3
79. Cottonwood Road/SR 58 EB ramps	Signal	B	11.1	B	17.6	B	10.7	B	19.6

*LOS summary based on SYNCHRO 6

Source: Parsons

4.6 Traffic Performance of Build Alternative C

Alternative C proposes to connect the east end of the Westside Parkway to State Route 58 east near Cottonwood Road by means of a new freeway. Starting at the Mohawk Street interchange, this alternative would traverse easterly, spanning the Kern River and Truxtun Avenue, and continue parallel to and south of the BNSF railroad tracks. It would then turn south and continue parallel to and west of State Route 99 for approximately one mile and connect with State Route 58 near the existing State Route 58/State Route 99 interchange. This alignment is illustrated on Figure 4-13. This alternative proposes undercrossings at California Avenue, Palm Avenue, State Route 99, Oak Street and Brundage Lane.

New branch connectors would be constructed for the eastbound State Route 58 to southbound State Route 99 and the northbound State Route 99 to westbound State Route 58 movements. Auxiliary lanes would be provided on State Route 99 to accommodate the additional traffic from State Route 58. Improvements on State Route 99 would extend from the Wilson Road overcrossing to the Gilmore Avenue overcrossing. A collector-distributor road system would provide access from westbound State Route 58 to northbound State Route 99 as well as from northbound State Route 99 to westbound State Route 58. The Wible Road on- and off-ramps south of the existing State Route 99/State Route 58 interchange would be removed to accommodate the northbound State Route 99 auxiliary lane. The Stockdale Avenue off-ramp from southbound State Route 99 to the eastbound State Route 58 connector would be removed. Local access from Real Road to southbound State Route 99 would be removed as well.

The traffic lane configuration of the freeway segments along State Route 58, the Westside Parkway, and State Route 99 are illustrated on Figure 4-14. Traffic demand volumes and interchange ramp configurations are also depicted on the graphic.

The following are locations where the new structures would be required for this alternative to allow the listed road to pass under or over the proposed new freeway alignment:

- Truxtun Avenue
- California Avenue
- Palm Street
- Brundage Lane
- Stockdale Highway

As the new freeway would be aligned adjacent to the BNSF railyard and the State Route 99 freeway, it would not bisect existing business parks or residential neighborhoods. The potential closure of Easton Drive would modify existing circulation, however.

Figure 3-15, shown previously, illustrated the difference between year 2038 alternative C and no-build daily traffic volumes, as assigned by the travel forecast model. In a like manner, Figure 4-16 illustrates the location and severity of traffic congestion on the alternative C road network. Comparison of this system-wide level of service “plot” to those prepared for alternative A (Figure 4-9) and alternative B (Figure 4-12) indicates very little difference among these three

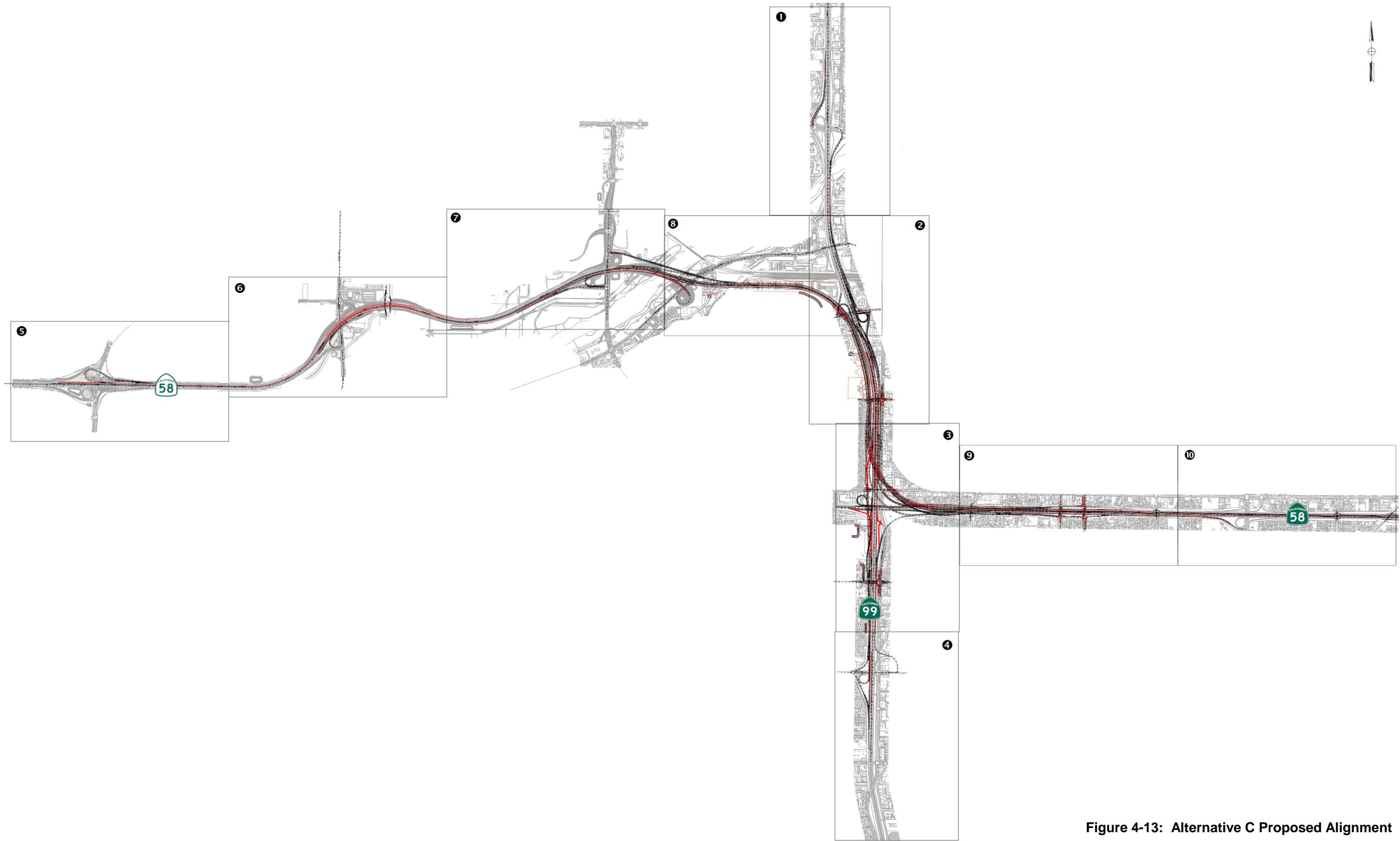


Figure 4-13: Alternative C Proposed Alignment

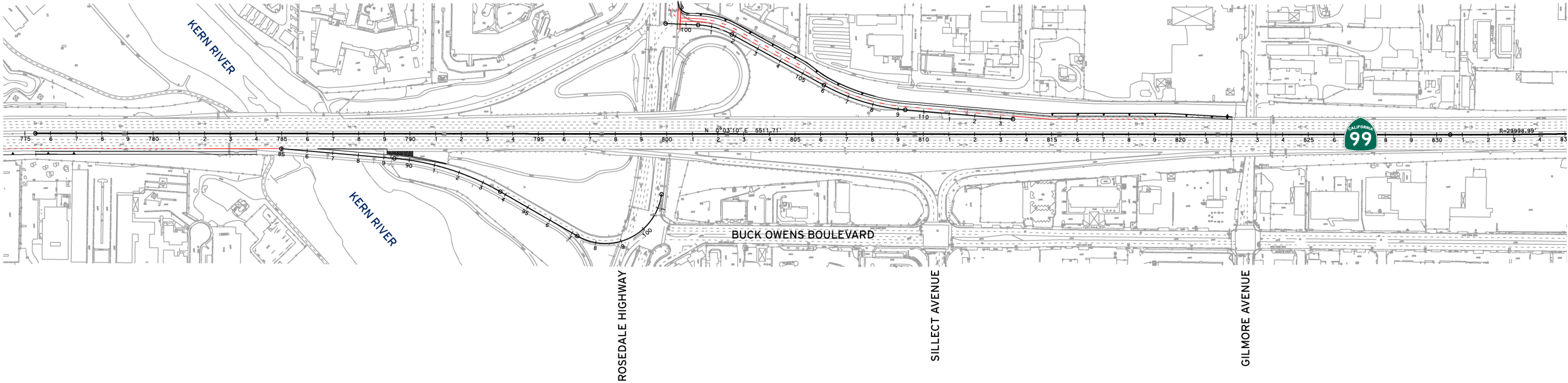


Figure 4-13: Alternative C Proposed Alignment
Sheet 1 of 10

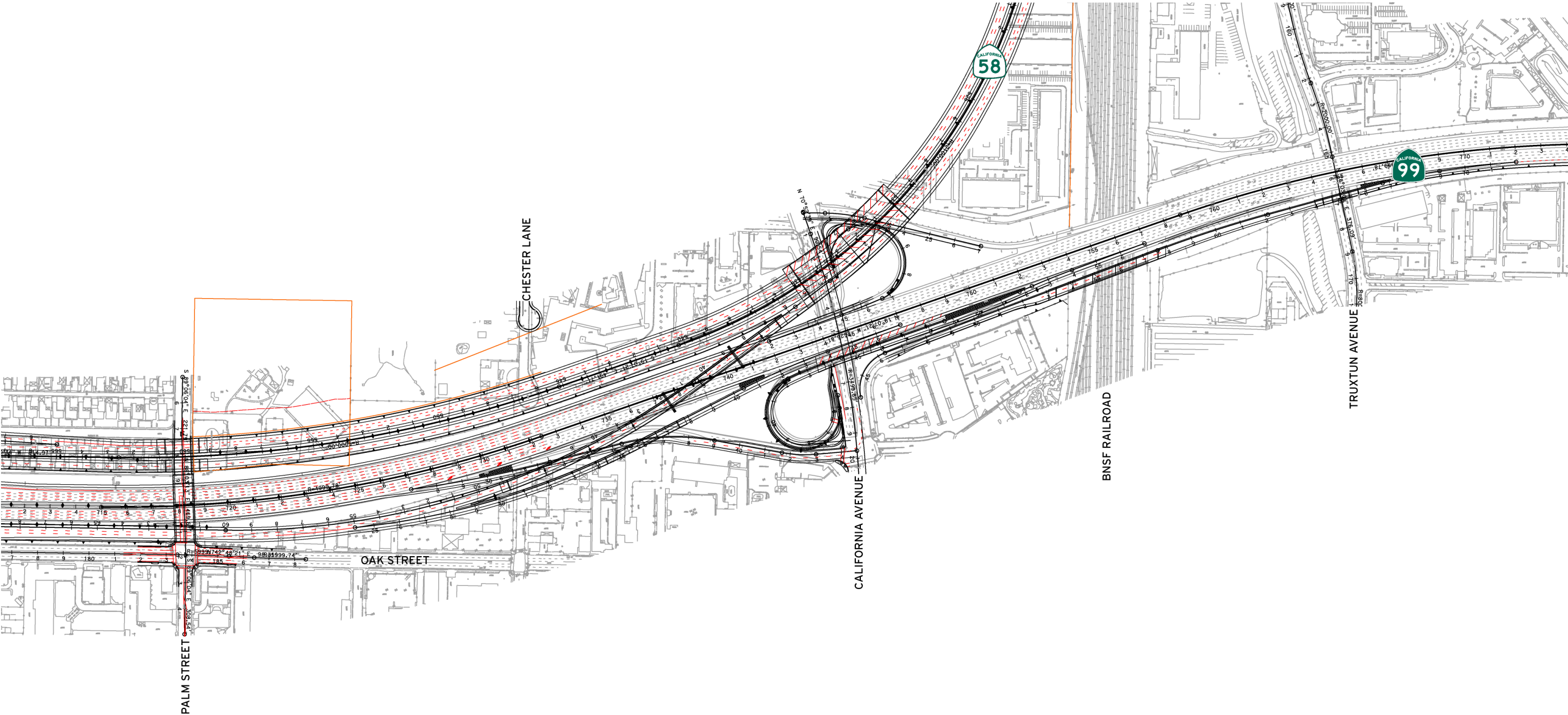


Figure 4-13: Alternative C Proposed Alignment
Sheet 2 of 10

3

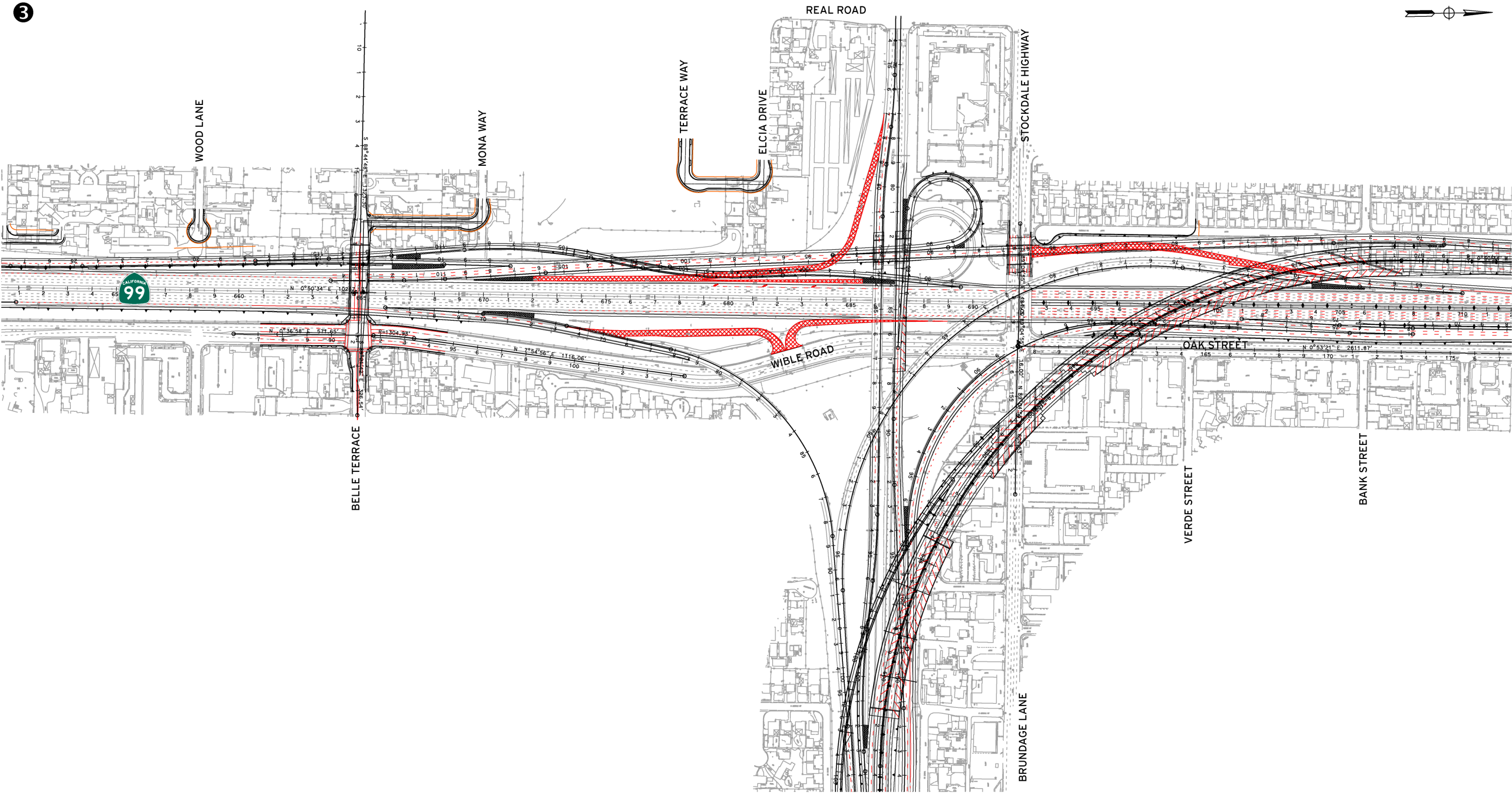


Figure 4-13: Alternative C Proposed Alignment
Sheet 3 of 10



Figure 4-13: Alternative C Proposed Alignment
Sheet 4 of 10

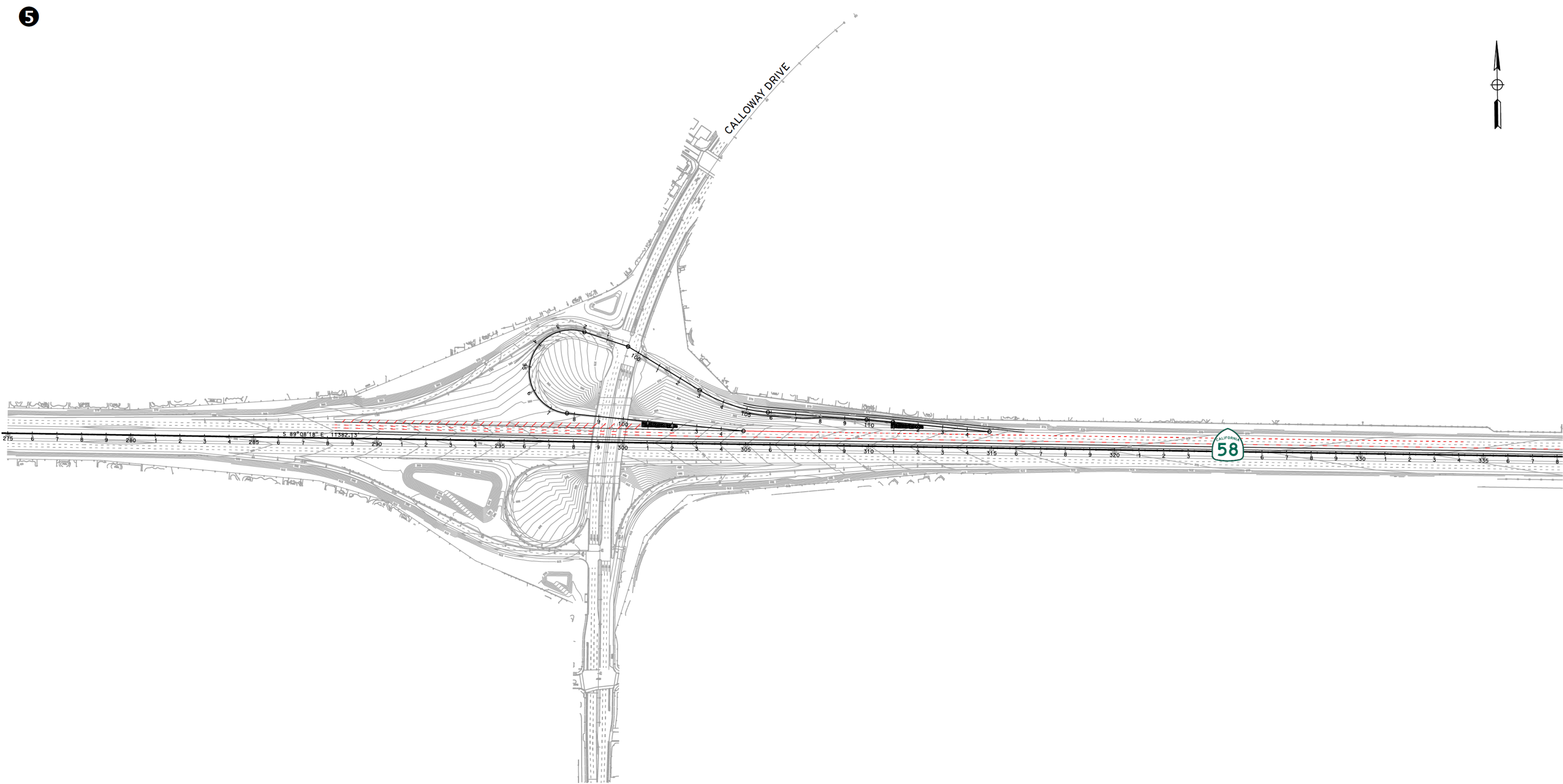


Figure 4-13: Alternative C Proposed Alignment
Sheet 5 of 10

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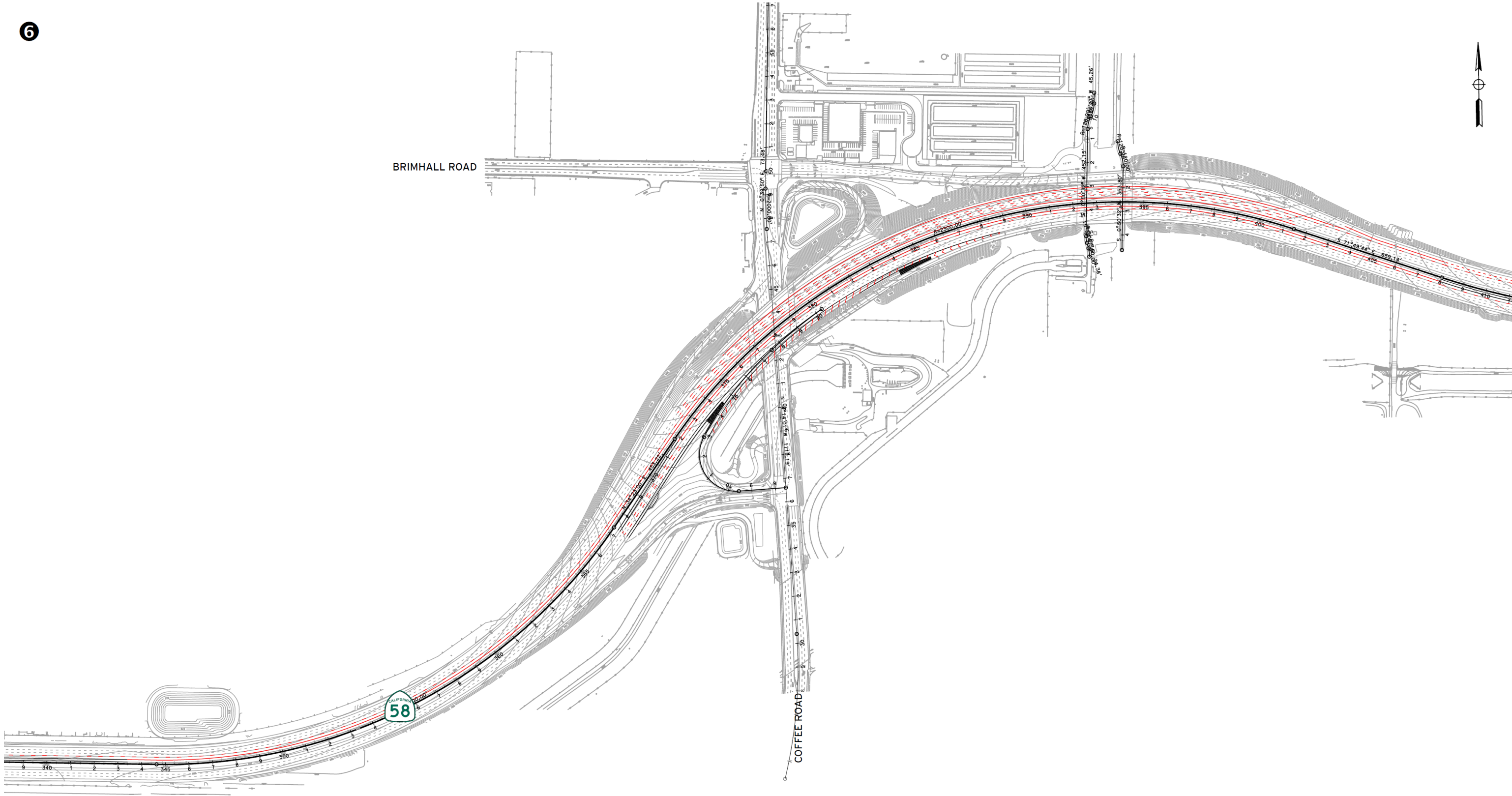


Figure 4-13: Alternative C Proposed Alignment
Sheet 6 of 10

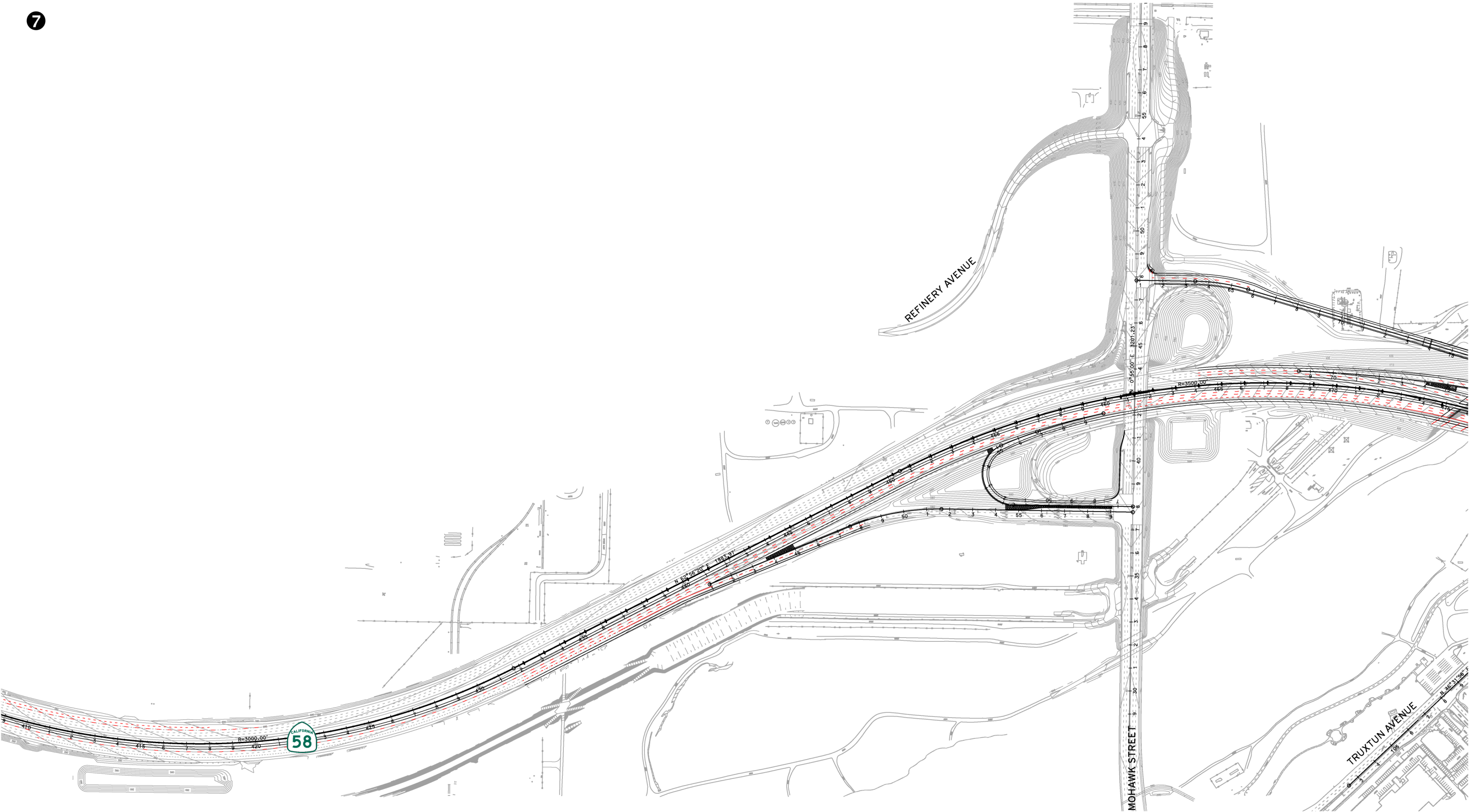


Figure 4-13: Alternative C Proposed Alignment
Sheet 7 of 10

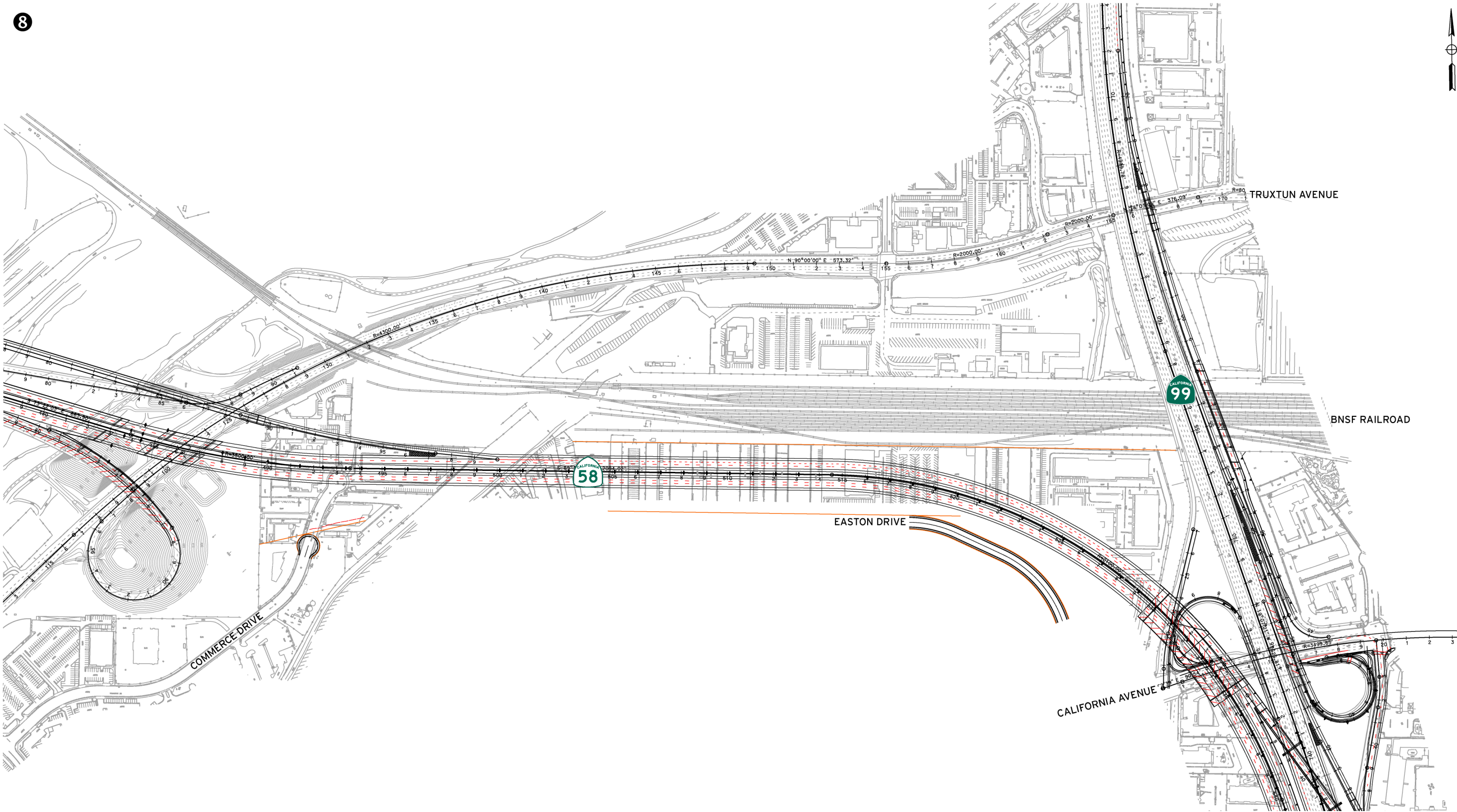


Figure 4-13: Alternative C Proposed Alignment
Sheet 8 of 10

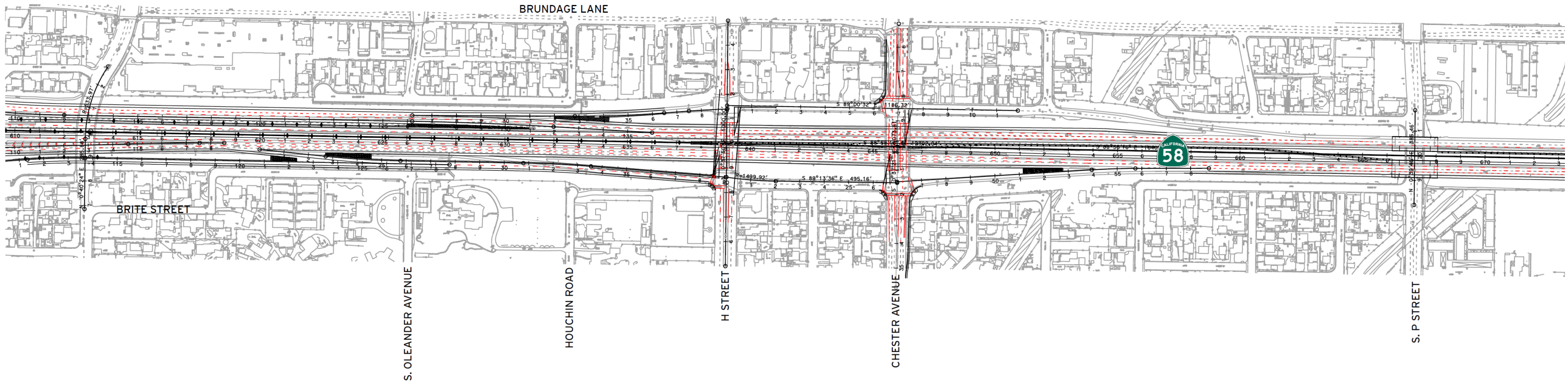


Figure 4-13: Alternative C Proposed Alignment
Sheet 9 of 10

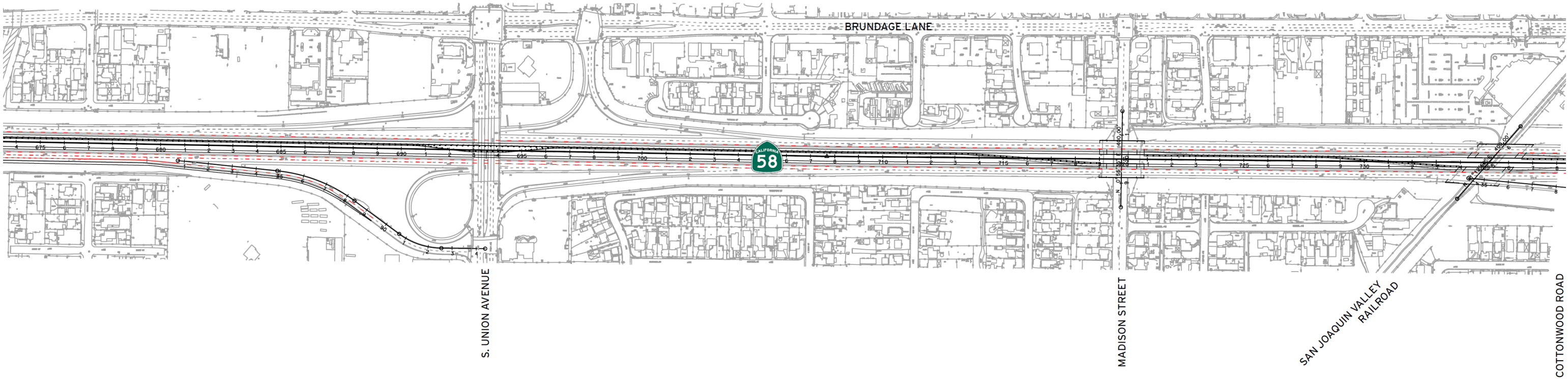
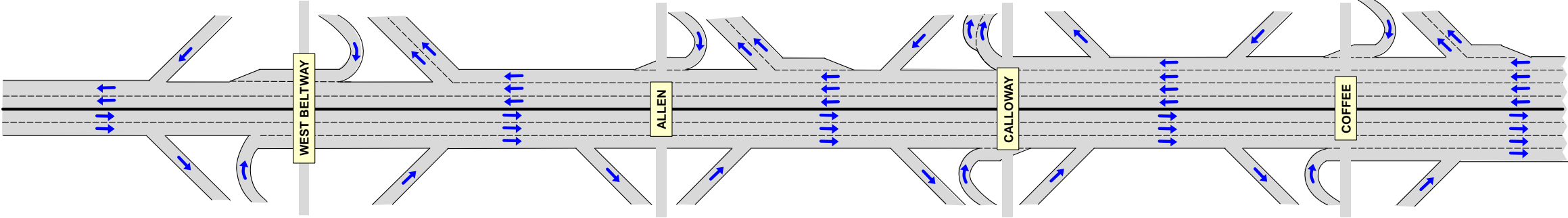


Figure 4-13: Alternative C Proposed Alignment
Sheet 10 of 10

A. State Route 58 and Westside Parkway

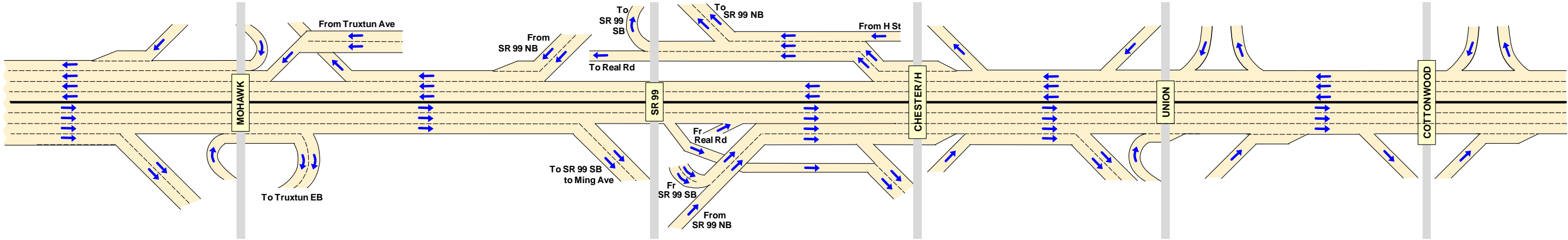
State Route 58 Westbound		MAINLINE	WEST BELTWAY					MAINLINE	ALLEN ROAD			MAINLINE	CALLOWAY DRIVE					MAINLINE	COFFEE ROAD					MAINLINE
			ON	MAINLINE	ON	MAINLINE	OFF		ON	MAINLINE	OFF		ON	MAINLINE	OFF	MAINLINE	OFF		ON	MAINLINE	ON	MAINLINE	OFF	
2038 ALTERNATIVE C	AM Peak	1,616	295	1,321	300	1,021	1,485	2,506	370	2,136	1,140	3,276	550	2,726	725	3,451	585	4,036	310	3,726	180	3,546	2,170	5,716
	PM Peak	2,305	375	1,930	475	1,455	2,220	3,675	445	3,230	2,100	5,330	1,055	4,275	1,265	5,540	950	6,490	595	5,895	300	5,595	2,110	7,705
	ADT	28,620	5,925	22,695	6,045	16,650	24,935	41,585	3,685	37,900	23,875	61,775	10,050	51,725	14,875	66,600	9,875	76,475	5,480	70,995	2,890	68,105	28,975	97,080



NOT TO SCALE

State Route 58 Eastbound		MAINLINE	WEST BELTWAY					MAINLINE	ALLEN ROAD			MAINLINE	CALLOWAY DRIVE					MAINLINE	COFFEE ROAD					MAINLINE
			OFF	MAINLINE	ON	MAINLINE	ON		OFF	MAINLINE	ON		OFF	MAINLINE	ON	MAINLINE	ON		OFF	MAINLINE	ON	MAINLINE	ON	
2038 ALTERNATIVE C	AM Peak	2,215	685	1,530	1,475	3,005	280	3,285	360	2,925	1,990	4,915	975	3,940	920	4,860	1,100	5,960	1,050	4,910	950	5,860	1,075	6,935
	PM Peak	2,210	850	1,360	1,325	2,685	255	2,940	295	2,645	1,820	4,465	825	3,640	965	4,605	1,085	5,690	875	4,815	1,070	5,885	1,110	6,995
	ADT	28,480	11,080	17,400	18,800	36,200	3,555	39,755	4,500	35,255	24,150	59,405	11,790	47,615	10,600	58,215	14,350	72,565	11,540	61,025	14,000	75,025	16,000	91,025

MOHAWK STREET/TRUXTUN AVENUE							MAINLINE	STATE ROUTE 99 SYSTEM INTERCHANGE			MAINLINE	H ST/CHESTER AVE			MAINLINE	UNION AVENUE					MAINLINE	COTTONWOOD ROAD			MAINLINE	State Route 58 WB	
MOHAWK ON	MAINLINE	MOHAWK ON	MAINLINE	TRUXTUN ON	MAINLINE	MOHAWK OFF		ON	MAINLINE	OFF		ON	MAINLINE	OFF		ON	MAINLINE	ON	MAINLINE	OFF		ON	MAINLINE	OFF			
810	4,906	625	4,281	1,000	3,281	890	4,171	1,735	2,435	2,605	5,690	650	5,040	825	5,865	770	5,095	500	4,595	825	5,420	375	5,045	200	5,245	AM Peak	2038 ALTERNATIVE C
975	6,730	1,205	5,525	1,875	3,650	790	4,440	1,870	2,570	2,625	5,900	705	5,195	705	5,900	710	5,190	410	4,780	675	5,455	585	4,870	275	5,145	PM Peak	
11,285	85,795	13,930	71,865	22,500	49,365	9,280	58,645	23,655	34,990	30,015	76,375	11,370	65,005	14,610	79,615	11,645	67,970	6,385	61,585	9,050	70,635	6,535	64,100	2,900	67,000	ADT	



MOHAWK STREET/TRUXTUN AVENUE					MAINLINE	STATE ROUTE 99 SYSTEM INTERCHANGE				MAINLINE	H ST/CHESTER AVE			MAINLINE	UNION AVENUE					MAINLINE	COTTONWOOD ROAD			MAINLINE	State Route 58 EB		
MOHAWK OFF	MAINLINE	MOHAWK ON	MAINLINE	TRUXTUN OFF		OFF	MAINLINE	FROM REAL RD ON	ON		OFF	MAINLINE	ON		OFF	MAINLINE	ON	MAINLINE	ON		OFF	MAINLINE	ON				
1,890	5,045	475	5,520	1,550	3,970	1,945	2,025	955	2,215	5,195	660	4,535	650	5,185	1,050	4,135	300	4,435	290	4,725	645	4,080	310	4,390			AM Peak
1,700	5,295	1,050	6,345	1,395	4,950	2,345	2,605	980	2,825	6,410	745	5,665	915	6,580	1,365	5,215	610	5,825	550	6,375	1,060	5,315	275	5,590			PM Peak
22,955	68,070	9,565	77,635	17,875	59,760	20,640	39,120	8,965	34,195	82,280	10,215	72,065	10,356	82,421	16,270	66,151	5,900	72,051	4,670	76,721	11,310	65,411	3,090	68,501	ADT		

Figure 4-14: Alternative C
Freeway Lane Configuration and
Forecast Traffic Volumes (1 of 2)

B. State Route 99

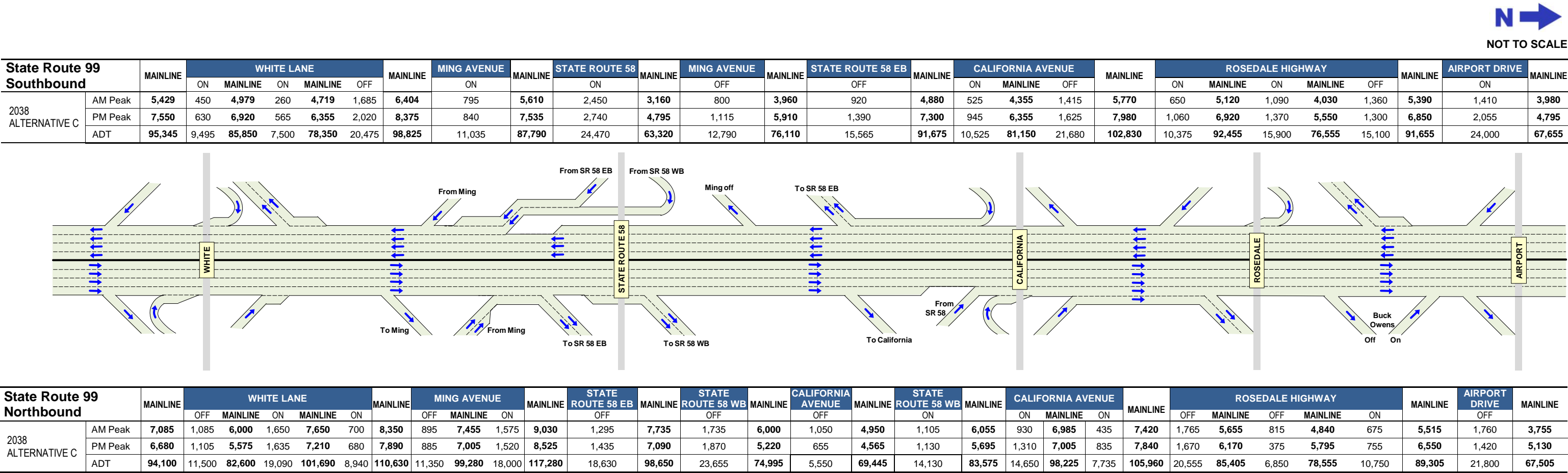


Figure 4-14: Alternative C
Freeway Lane Configuration and
Forecast Traffic Volumes (2 of 2)

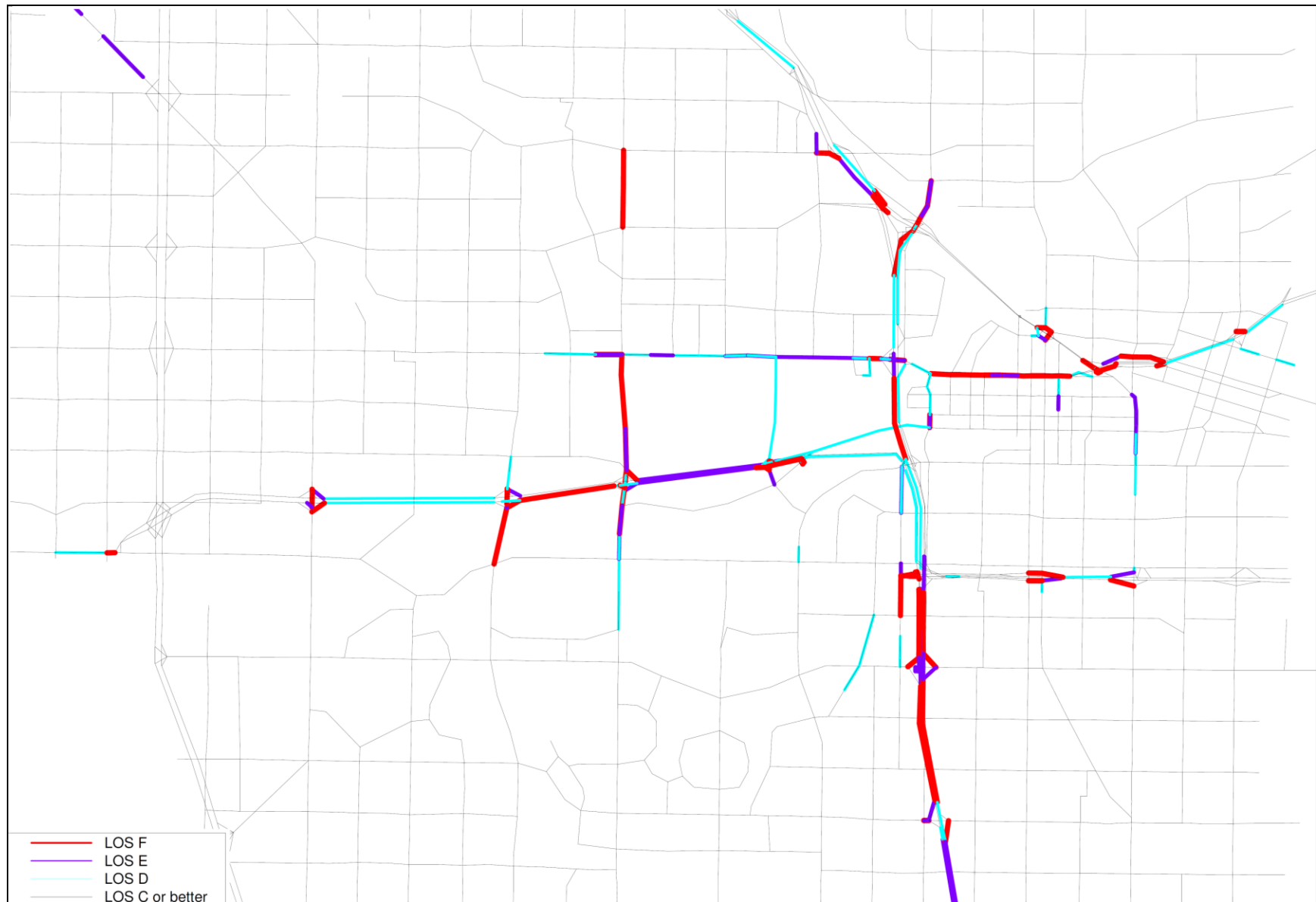


Figure 4-15: Locations of Congestion for Alternative C

build alternatives. As noted for alternative B, differences in traffic impacts would be expected in local, neighborhood circulation patterns.

Similar to the information reported for the build A and B alternatives, Table 4-29 presents measures of effectiveness performance data for Alternative C AM peak hour conditions, while Table 4-30 presents PM peak hour data. Both sets of data are extracted from the CORSIM traffic simulation model output and pertain to freeway mainline segments. Segments expected to operate with LOS E or F performance in the design year of 2038 are highlighted.

With respect to 2038 AM peak hour conditions, Table 4-29 indicates that only two segments of the freeway system, northbound State Route 99 between the White Lane loop on-ramp and the Ming Avenue off-ramp, will operate at LOS E. Of the 79 freeway segments analyzed, 61 will operate at LOS C or better, 16 at LOS D, and two at LOS E, as mentioned above. Speeds will range between 55 and 64 mph and nearly all of the demand volumes will be served.

During the PM peak hour, traffic operations will be nearly as good as AM peak hour conditions. Of the 79 freeway segments analyzed, 44 will operate at LOS C or better, 32 segments will operate at LOS D, and three segments will operate at LOS E or F.

- Southbound State Route 99 between the Rosedale Highway loop on-ramp and the Rosedale Highway diagonal on-ramp (LOS E)
- Southbound State Route 99 between the Rosedale Highway diagonal on-ramp and the California Avenue off-ramp (LOS F)
- Southbound State Route 99 between the Ming Avenue on-ramp and the White Lane off-ramp (LOS F).

The percentage of demand traffic volumes served will fall below 90 percent in one reach of State Route 99.

- Northbound between the California Avenue diagonal on-ramp and north of the Airport Drive off-ramp (87 to 89 percent served)

Along the Westside Parkway/State Route 58, speeds will range between 57 and 64 mph. Along State Route 99, speeds will range between 51 and 63 mph for the most part.

Motorists will experience slower speeds, below 50 mph, on three segments of southbound State Route 99 during the PM peak hour.

Freeway on-ramp and off-ramp performance, and interchange merge/diverge conditions are reported in Tables 4-31 through 4-34. Ramp terminal and other study intersection level of service performance are provided in Table 4-35. The results are similar to those reported for build alternative A.

Table 4-29. AM Peak Hour Measures of Effectiveness for Alternative C—Freeway Mainline Segments (1 of 2)

FREEWAY SEGMENT	YEAR 2018													YEAR 2038												
	DEMAND (vph)	SERVED (vph)	% SERVED	TRAVEL TIME (sec/veh)	DELAY TIME (sec/veh)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	CUMULATIVE TIME (sec/veh)	VEHICLE MILES (VMT)	VEHICLE HOURS (VHT)	VEHICLE DELAY (VHD)	CORSIM SERVED VOLUMES/LANES (vphl)	DEMAND (vph)	SERVED (vph)	% SERVED	TRAVEL TIME (sec/veh)	DELAY TIME (sec/veh)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	CUMULATIVE TIME (sec/veh)	VEHICLE MILES (VMT)	VEHICLE HOURS (VHT)	VEHICLE DELAY (VHD)	CORSIM SERVED VOLUMES/LANES (vphl)
State Route 99 NB Mainline																										
SR-99 NB south end of the network to White Lane off-ramp	5,065	5,065	100%	50	1	63	20	C	50	4458	71	2	1269	7,085	7,085	100%	51	2	62	29	D	51	6226	101	5	1774
White Lane off-ramp to White Lane loop on-ramp	4,370	4,370	100%	19	1	63	17	B	69	1466	23	1	1095	6,000	6,000	100%	20	1	61	24	C	71	2013	33	2	1503
White Lane loop on-ramp to White Lane diagonal on-ramp	5,990	5,812	97%	7	1	53	27	D	76	611	12	2	1453	7,650	7,241	95%	8	3	45	40	E	79	761	17	5	1810
White Lane diagonal on-ramp to Ming Avenue off-ramp	6,705	6,705	100%	77	6	59	29	D	153	8542	144	12	1689	8,350	8,324	100%	79	8	58	36	E	158	10524	182	19	2081
Ming Avenue off-ramp to Ming Avenue on-ramp	5,970	5,970	100%	25	1	62	25	C	179	2629	43	2	1514	7,455	7,455	100%	26	2	61	31	D	183	3241	53	3	1869
Ming Avenue on-ramp to SR 58 EB off-ramp	7,325	7,325	100%	11	1	59	25	C	189	1308	22	2	1657	9,030	9,030	100%	11	1	59	31	D	194	1591	27	3	2016
SR 58 EB off-ramp to SR 99 NB C-D off-ramp (WSP WB)	6,170	5,879	95%	42	2	61	21	C	231	4155	68	3	1306	7,735	7,303	94%	42	3	60	27	D	237	5161	86	6	1623
SR9 9 NB C-D off-ramp (WSP WB) to California Avenue off-ramp	4,525	4,525	100%	33	2	62	19	C	264	2659	43	2	1171	6,000	5,948	99%	34	2	61	24	C	270	3380	56	3	1487
California Avenue off-ramp to SR 99 NB C-D on-ramp (SR 58 WB and H Street)	3,560	3,560	100%	17	1	61	15	B	280	1036	17	1	1049	4,950	4,933	100%	17	2	59	21	C	287	1393	24	2	1409
SR 99 NB C-D on-ramp (SR 58 WB and H Street) to California Avenue loop on-ramp	4,815	4,815	100%	11	1	61	20	C	292	936	15	1	1236	6,055	5,986	99%	11	1	60	25	C	299	1134	19	1	1497
California Avenue loop on-ramp to California Avenue diagonal on-ramp	5,650	5,650	100%	18	2	58	25	C	309	1609	28	3	1417	6,985	6,688	96%	18	2	58	29	D	316	1898	33	3	1672
California Avenue diagonal on-ramp to Rosedale Highway off-ramp	6,035	6,003	99%	13	1	59	20	C	322	1250	21	2	1334	7,420	7,057	95%	13	1	59	24	C	329	1470	25	2	1568
Rosedale Highway off-ramp to Buck Owens Blvd/Sillect Avenue off-ramp	4,420	4,339	98%	17	1	62	18	B	338	1233	20	1	1085	5,655	5,349	95%	17	1	61	22	C	346	1519	25	2	1337
Buck Owens Boulevard/Sillect Avenue off-ramp to Buck Owens Boulevard/Sillect Avenue on-ramp	3,860	3,776	98%	24	1	63	15	B	362	1569	25	1	944	4,840	4,595	95%	24	1	62	18	C	370	1909	31	1	1149
Buck Owens Boulevard/Sillect Avenue on-ramp to Airport Drive off-ramp	4,280	4,154	97%	34	2	61	17	B	396	2362	39	2	1038	5,515	5,253	95%	35	3	59	22	C	405	2987	51	5	1313
Airport Drive off-ramp to SR 99 NB north end of the network	2,755	2,639	96%	40	1	63	10	A	436	1864	29	1	660	3,755	3,518	94%	41	1	63	14	B	445	2484	40	1	880
State Route 99 SB Mainline																										
SR 99 SB north end of the network to Airport Drive on-ramp	3,200	3,200	100%	48	1	64	13	B	48	2745	43	1	805	3,980	3,980	100%	48	1	64	16	B	48	3413	53	1	1000
Airport Drive on-ramp to Rosedale Highway off-ramp	4,485	4,388	98%	31	1	62	17	B	79	2335	38	2	975	5,390	5,314	99%	32	2	60	21	C	80	2841	47	4	1181
Rosedale Highway off-ramp to Rosedale Highway loop on-ramp	3,815	3,696	97%	25	1	63	15	B	103	1590	25	1	924	4,030	4,009	99%	25	1	63	16	B	105	1724	27	1	1002
Rosedale Highway loop on-ramp to Rosedale Highway direct on-ramp	4,735	4,633	98%	9	1	58	17	B	113	702	12	1	1158	5,120	5,120	100%	10	1	55	20	C	114	782	14	2	1290
Rosedale Highway direct on-ramp to California Avenue off-ramp	5,280	5,190	98%	36	3	60	21	C	149	3144	52	4	1298	5,770	5,770	100%	38	4	58	24	C	152	3502	60	6	1447
California Avenue off-ramp to California Avenue on-ramp	4,155	4,097	99%	13	0	63	16	B	162	954	15	1	1024	4,355	4,355	100%	13	1	62	18	B	165	1022	16	1	1098
California Avenue on-ramp to SR 58 EB off-ramp	4,590	4,515	98%	27	1	62	15	B	189	2084	34	1	1003	4,880	4,880	100%	27	1	62	16	B	192	2253	36	2	1085
SR58 EB off-ramp to SR 99 SB off-ramp (Ming Avenue)	3,795	3,699	97%	28	1	62	15	B	217	1794	29	1	925	3,960	3,935	99%	28	1	62	16	B	220	1909	31	1	984
SR 99 SB off-ramp (Ming Avenue) to SR 99 SB on-ramp (Westside Parkway EB and SR 58 WB and H Street)	3,065	3,005	98%	30	1	63	12	B	247	1557	25	1	859	3,160	3,118	99%	30	1	63	12	B	250	1615	26	1	891
SR 99 SB on-ramp (Westside Parkway EB and SR 58 WB and H Street) to Ming Avenue on-ramp	4,520	4,410	98%	44	2	63	14	B	291	3346	53	2	980	5,609	5,509	98%	45	2	61	18	B	295	4186	68	4	1224
Ming Avenue on-ramp to White Lane off-ramp	5,020	4,927	98%	60	3	62	19	C	350	5053	82	4	1095	6,404	6,284	98%	64	7	58	26	C	358	6489	111	12	1396
White Lane off-ramp to White Lane loop on-ramp	3,605	3,523	98%	19	1	63	14	B	370	1181	19	0	881	4,719	4,653	99%	19	1	62	19	C	378	1559	25	1	1163
White Lane loop on-ramp to White Lane diagonal on-ramp	3,795	3,689	97%	10	0	63	15	B	379	625	10	0	922	4,979	4,766	96%	10	0	62	19	C	387	807	13	0	1192
White Lane diagonal on-ramp to SR 99 SB south end of the network	4,049	3,928	97%	52	2	63	16	B	431	3551	57	2	982	5,246	5,063	97%	52	2	62	20	C	440	4578	74	3	1266
State Route 99 NB Collector-Distributor																										
SR 99 NB C-D on-ramp to SR 99 NB C-D off-ramp	3,375	3,336	99%	27	1	52	21	C	54	1297	25	1	1334	3,490	3,490	100%	27	1	53	22	C	53	1363	26	1	1402
State Route 99 SB Collector-Distributor																										
SR 58 WB C-D on-ramp to SR 99 SB C-D off-ramp	2,200	2,129	97%	13	1	52	14	B	40	401	8	0	710	3,320	3,236	97%	13	1	52	21	C	41	610	12	1	1079
SR 99 SB C-D off-ramp to SR 99 SB C-D on-ramp	745	718	96%	10	0	49	15	B	50	97	2	0	718	870	840	97%	10	0	49	17	B	51	113	2	0	840
SR 99 SB C-D on-ramp to Ming Avenue off-ramp	1,455	1,409	97%	17	0	48	15	B	68	328	7	0	704	1,670	1,664	100%	17	1	48	17	B	68	388	8	0	832

Table 4-29. AM Peak Hour Measures of Effectiveness for Alternative C—Freeway Mainline Segments (2 of 2)

FREEWAY SEGMENT	YEAR 2018													YEAR 2038													
	DEMAND (vph)	SERVED (vph)	% SERVED	TRAVEL TIME (sec/veh)	DELAY TIME (sec/veh)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	CUMULATIVE TIME (sec/veh)	VEHICLE MILES (VMT)	VEHICLE HOURS (VHT)	VEHICLE DELAY (VHD)	CORSIM SERVED VOLUMES/LANES (vphl)	DEMAND (vph)	SERVED (vph)	% SERVED	TRAVEL TIME (sec/veh)	DELAY TIME (sec/veh)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	CUMULATIVE TIME (sec/veh)	VEHICLE MILES (VMT)	VEHICLE HOURS (VHT)	VEHICLE DELAY (VHD)	CORSIM SERVED VOLUMES/LANES (vphl)	
Westside Parkway EB Mainline																											
Westside Parkway west end of the network to West Beltway off-ramp	— NOT APPLICABLE —													2,215	2,215	100%	6	2	46	25	C	6	187	4	1	1143	
West Beltway off-ramp to West Beltway loop on-ramp	— NOT APPLICABLE —													1,530	1,517	99%	14	1	60	13	B	20	356	6	0	759	
West Beltway loop on-ramp to West Beltway Direct on-ramp	— NOT APPLICABLE —													3,005	2,966	99%	9	1	61	16	B	30	463	8	0	989	
West Beltway diagonal on-ramp to Allen Road off-ramp	1,035	970	94%	83	3	61	7	A	83	1370	22	1	485	3,285	3,209	98%	57	2	62	17	B	87	3157	51	2	1070	
Allen Road off-ramp to Allen Road on-ramp	980	946	97%	32	0	64	5	A	115	538	8	0	315	2,925	2,843	97%	33	1	63	15	B	119	1619	26	1	948	
Allen Road on-ramp to Calloway Drive off-ramp	2,705	2,694	100%	59	3	62	14	B	174	2733	44	2	898	4,915	4,870	99%	62	6	60	27	D	181	5003	84	8	1623	
Calloway Drive off-ramp to Calloway Drive loop on-ramp	2,165	2,165	100%	24	1	64	12	B	198	959	15	0	738	3,940	3,940	100%	25	1	63	21	C	206	1715	27	1	1320	
Calloway Drive Loop on-ramp to Calloway Drive diagonal on-ramp	2,915	2,890	99%	11	1	61	16	B	209	547	9	1	963	4,860	4,806	99%	12	1	59	27	D	218	910	15	2	1602	
Calloway Drive diagonal on-ramp to Coffee Road off-ramp	4,010	4,010	100%	49	3	61	21	C	258	3379	55	3	1349	5,960	5,960	100%	50	4	60	32	D	268	5017	84	7	1999	
Coffee Road off-ramp to Coffee Road loop on-ramp	3,340	3,340	100%	23	1	63	18	B	281	1354	21	1	1128	4,910	4,872	99%	23	1	62	26	D	291	1948	31	1	1624	
Coffee Road loop on-ramp to Coffee Road diagonal on-ramp	4,220	4,216	100%	11	0	62	17	B	292	799	13	0	1054	5,860	5,811	99%	11	1	62	24	C	302	1101	18	1	1453	
Coffee Road diagonal on-ramp to Mohawk Street off-ramp	4,825	4,760	99%	56	3	61	19	C	348	4476	74	5	1190	6,935	6,878	99%	62	10	55	31	D	365	6541	119	19	1720	
Mohawk Street off-ramp to Mohawk Street on-ramp	3,350	3,311	99%	20	1	61	18	B	368	1118	18	1	1104	5,045	5,009	99%	20	1	61	27	D	385	1693	28	1	1670	
Mohawk Street on-ramp to Truxtun Avenue off-ramp	3,870	3,838	99%	20	1	61	16	B	388	1297	21	1	1096	5,520	5,471	99%	20	1	60	23	C	405	1849	31	2	1563	
Truxtun Avenue off-ramp to SR 99 SB C-D off-ramp (SR 99 SB and Ming Avenue)	2,465	2,420	98%	82	2	63	13	B	469	3448	55	1	807	3,970	3,899	98%	83	4	62	21	C	488	5550	90	4	1300	
SR 99 SB C-D off-ramp (SR 99 SB and Ming Avenue) to H Street off-ramp	1,345	1,327	99%	37	1	63	11	A	506	864	14	0	663	2,025	1,964	97%	37	1	63	16	B	525	1280	20	1	982	
H Street off-ramp to Real Road on-ramp	888	888	100%	18	0	64	7	A	524	285	4	0	457	1,685	1,652	98%	18	1	63	13	B	543	515	8	0	826	
Real Road on-ramp to SR 99 NB and SB on-ramp	1,808	1,805	100%	10	1	62	15	B	534	311	5	0	902	2,663	2,560	96%	10	1	60	22	C	554	442	7	1	1280	
SR 99 NB and SB on-ramp to Chester Avenue on-ramp	3,550	3,550	100%	45	2	63	15	B	579	2816	45	2	1039	4,535	4,535	100%	45	2	62	18	C	599	3516	57	3	1297	
Chester Avenue on-ramp to Union Avenue off-ramp	4,045	4,045	100%	27	1	62	17	B	605	1873	30	1	1166	5,185	5,185	100%	27	2	61	21	C	626	2381	39	2	1481	
Union Avenue off-ramp to Union Avenue loop on-ramp	3,235	3,235	100%	17	1	63	17	B	622	940	15	0	1080	4,135	4,135	100%	17	1	62	22	C	643	1217	20	1	1397	
Union Avenue loop on-ramp to Union Avenue diagonal on-ramp	3,500	3,460	99%	8	0	62	19	C	630	484	8	0	1153	4,435	4,434	100%	8	0	62	24	C	651	620	10	1	1478	
Union Avenue diagonal on-ramp to Cottonwood Road off-ramp	3,750	3,715	99%	31	1	62	20	C	661	1973	32	1	1238	4,725	4,715	100%	31	2	61	26	C	682	2504	41	2	1572	
Cottonwood Road off-ramp to Cottonwood Road on-ramp	3,220	3,150	98%	28	1	63	17	B	689	1523	24	1	1050	4,080	4,058	99%	28	1	62	22	C	710	1962	31	1	1353	
Cottonwood Road on-ramp to SR 58 east end of the network	3,445	3,374	98%	25	1	63	18	B	714	1472	24	1	1125	4,390	4,344	99%	25	1	62	23	C	735	1896	31	2	1448	
Westside Parkway WB Mainline																											
SR 58 east end of the network to Cottonwood Road off-ramp	3,640	3,640	100%	26	0	63	19	C	26	1665	26	0	1220	5,245	5,245	100%	26	1	63	28	D	26	2397	38	1	1758	
Cottonwood Road off-ramp to Cottonwood Road on-ramp	3,440	3,440	100%	18	1	63	18	C	43	1059	17	1	1149	5,045	5,017	99%	18	1	62	27	D	44	1541	25	1	1672	
Cottonwood Road on-ramp to Brundage Lane off-ramp	3,730	3,718	100%	38	2	62	20	C	82	2460	40	2	1239	5,420	5,372	99%	39	3	61	30	D	83	3551	59	4	1791	
Brundage Lane off-ramp to Brundage Lane on-ramp	3,190	3,174	99%	17	1	62	17	B	99	936	15	1	1058	4,595	4,592	100%	17	1	61	25	C	101	1355	22	1	1531	
Brundage Lane on-ramp to Union Avenue on-ramp	3,640	3,541	97%	12	1	61	19	C	111	725	12	1	1180	5,095	4,984	98%	12	1	60	28	D	113	1022	17	1	1661	
Union Avenue on-ramp to Chester Avenue off-ramp	4,210	4,149	99%	23	1	61	17	B	134	1615	26	1	1185	5,865	5,784	99%	23	2	60	24	C	136	2253	38	3	1653	
Chester Avenue off-ramp to SR 58 WB C-D off-ramp (SR 99 NB and SB and Real Road)	3,535	3,476	98%	30	2	60	17	B	164	1747	29	2	993	5,040	4,792	95%	30	2	59	23	C	167	2406	40	3	1369	
SR 58 WB C-D off-ramp (SR 99 NB and SB and Real Road) to SR 99 NB C-D on-ramp (SR 99 NB and H Street)	765	765	100%	112	2	64	6	A	276	1545	24	0	388	1,785	1,785	100%	114	4	63	14	B	281	3563	57	2	895	
SR99 NB C-D on-ramp (SR 99 NB and H Street) to Mohawk Street off-ramp	2,885	2,840	98%	39	2	61	16	B	315	1856	30	2	1136	4,171	4,171	100%	40	3	59	24	C	321	2756	47	4	1692	
Mohawk Street off-ramp to Truxtun Avenue on-ramp	2,240	2,209	99%	27	1	63	18	B	342	1046	17	1	1105	3,281	3,266	100%	28	1	61	27	D	349	1547	25	1	1633	
Truxtun Avenue on-ramp to Mohawk Street loop on-ramp	3,180	3,135	99%	11	1	62	17	B	353	594	10	0	1045	4,281	4,235	99%	11	1	61	23	C	360	802	13	1	1412	
Mohawk Street loop on-ramp to Mohawk Street direct ramp	3,735	3,633	97%	14	1	63	15	B	367	896	14	1	908	4,906	4,853	99%	14	1	62	20	C	374	1197	19	1	1213	
Mohawk Street direct ramp to Coffee Road off-ramp	4,230	3,970	94%	43	2	62	15	B	410	2896	47	2	882	5,716	5,378	94%	43	2	61	20	C	417	3924	65	4	1195	
Coffee Road off-ramp to Coffee Road loop on-ramp	2,510	2,370	94%	35	1	64	9	A	445	1485	23	0	593	3,546	3,522	99%	36	1	63	14	B	453	2206	35	1	880	
Coffee Road loop on-ramp to Coffee Road direct on-ramp	2,665	2,503	94%	12	0	64	10	A	457	545	9	0	626	3,726	3,656	98%	12	0	63	14	B	465	796	13	0	914	
Coffee Road direct on-ramp to Calloway Drive direct off-ramp	2,935	2,791	95%	48	1	63	11	A	505	2349	37	1	698	4,036	3,903	97%	48	2	63	15	B	514	3278	52	2	976	
Calloway Drive direct off-ramp to Calloway Drive loop off-ramp	2,275	2,206	97%	11	0	62	9	A	516	418	7	0	552	3,451	3,335	97%	11	0	62	13	B	525	631	10	0	834	
Calloway Drive loop off-ramp to Calloway Drive on-ramp	1,320	1,297	98%	24	0	64	7	A	540	555	9	0	432	2,726	2,656	97%	24	1	63	14	B	549	1135	18	1	885	
Calloway Drive on-ramp to Allen Road off-ramp	1,635	1,613	99%	57	2	63	8	A	597	1606	25	1	538	3,276	3,168	97%	58	3	62	17	B	607	3151	51	3	1056	
Allen Road off-ramp to Allen Road on-ramp	560	560	100%	26	0	65	3	A	623	269	4	0	192	2,136	2,064	97%	27	1	64								

Table 4-30. PM Peak Hour Measures of Effectiveness for Alternative C—Freeway Mainline Segments (1 of 2)

Freeway Segment	Year 2018													Year 2038												
	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	CORSIM Served Volumes/Lanes (vphl)	Demand (vph)	Served (vph)	% Served	Travel Time (sec/veh)	Delay Time (sec/veh)	Speed (mph)	Density (veh/ln/mi)	LOS (HCM 2000)	Cumulative Time (sec/veh)	Vehicle Miles (VMT)	Vehicle Hours (VHT)	Vehicle Delay (VHD)	CORSIM Served Volumes/Lanes (vphl)
State Route 99 NB Mainline																										
SR-99 NB south end of the network to White Lane off-ramp	4,615	4,615	100%	50	1	63	18	C	50	4067	64	2	1157	6,680	6,680	100%	51	2	62	27	D	51	5874	95	4	1674
White Lane off-ramp to White Lane loop on-ramp	3,935	3,930	100%	19	1	63	16	B	69	1316	21	1	983	5,575	5,524	99%	19	1	62	22	C	70	1850	30	1	1381
White Lane loop on-ramp to White Lane diagonal on-ramp	5,395	5,122	95%	7	1	57	22	C	76	539	9	1	1281	7,210	6,578	91%	7	2	51	32	D	78	692	14	3	1645
White Lane diagonal on-ramp to Ming Avenue off-ramp	5,990	5,884	98%	75	5	60	24	C	151	7443	123	8	1471	7,890	7,598	96%	78	7	59	32	D	155	9605	164	15	1899
Ming Avenue off-ramp to Ming Avenue on-ramp	5,185	5,103	98%	25	1	62	21	C	176	2215	36	2	1276	7,005	6,754	96%	26	2	61	28	D	181	2929	48	3	1689
Ming Avenue on-ramp to SR 58 EB off-ramp	6,460	6,388	99%	11	1	60	21	C	187	1121	19	1	1420	8,525	8,291	97%	11	1	59	28	D	192	1453	25	2	1842
SR 58 EB off-ramp to SR 99 NB C-D off-ramp (WSP WB)	5,130	4,849	95%	41	2	61	18	B	228	3424	56	3	1078	7,090	6,490	92%	42	3	61	24	C	233	4586	76	5	1442
SR9 9 NB C-D off-ramp (WSP WB) to California Avenue off-ramp	3,395	3,395	100%	33	1	62	14	B	261	1936	31	1	853	5,220	5,112	98%	33	2	62	21	C	267	2905	47	2	1278
California Avenue off-ramp to SR 99 NB C-D on-ramp (SR 58 WB and H Street)	2,795	2,795	100%	16	1	62	11	B	277	796	13	0	806	4,565	4,404	96%	17	1	60	18	C	284	1244	21	2	1258
SR 99 NB C-D on-ramp (SR 58 WB and H Street) to California Avenue loop on-ramp	4,000	4,000	100%	11	1	61	17	B	289	768	13	1	1013	5,695	5,493	96%	11	1	61	23	C	295	1041	17	1	1373
California Avenue loop on-ramp to California Avenue diagonal on-ramp	4,860	4,754	98%	17	2	58	20	C	306	1349	23	2	1188	7,005	6,287	90%	18	2	58	27	D	312	1785	31	3	1572
California Avenue diagonal on-ramp to Rosedale Highway off-ramp	5,485	5,260	96%	13	1	59	18	B	319	1096	19	2	1169	7,840	6,948	89%	13	1	58	24	C	325	1448	25	2	1544
Rosedale Highway off-ramp to Buck Owens Blvd/Sillect Avenue off-ramp	3,905	3,700	95%	16	1	62	15	B	335	1051	17	1	925	6,170	5,380	87%	17	1	61	22	C	342	1529	25	1	1345
Buck Owens Boulevard/Sillect Avenue off-ramp to Buck Owens Boulevard/Sillect Avenue on-ramp	3,585	3,386	94%	24	1	63	13	B	359	1407	22	1	847	5,795	5,030	87%	24	1	62	20	C	366	2090	34	1	1258
Buck Owens Boulevard/Sillect Avenue on-ramp to Airport Drive off-ramp	4,315	4,056	94%	34	2	60	17	B	393	2306	38	3	1014	6,550	5,747	88%	35	3	59	24	C	401	3266	56	5	1437
Airport Drive off-ramp to SR 99 NB north end of the network	2,975	2,799	94%	40	1	63	11	B	433	1977	31	1	700	5,130	4,482	87%	41	2	62	18	B	442	3166	51	2	1121
State Route 99 SB Mainline																										
SR 99 SB north end of the network to Airport Drive on-ramp	3,540	3,540	100%	48	1	64	14	B	48	3038	47	1	890	4,795	4,795	100%	49	1	63	19	C	49	4116	65	2	1205
Airport Drive on-ramp to Rosedale Highway off-ramp	5,330	5,317	100%	31	2	61	21	C	79	2836	46	3	1182	6,850	6,850	100%	36	7	55	31	D	85	3828	70	13	1555
Rosedale Highway off-ramp to Rosedale Highway loop on-ramp	4,630	4,628	100%	25	1	62	19	C	104	1991	32	1	1157	5,550	5,550	100%	26	2	60	24	C	110	2483	41	3	1443
Rosedale Highway loop on-ramp to Rosedale Highway direct on-ramp	5,960	5,960	100%	11	2	51	25	C	115	909	18	3	1500	6,920	6,920	100%	13	4	43	36	E	123	1080	25	8	1782
Rosedale Highway direct on-ramp to California Avenue off-ramp	6,780	6,766	100%	39	6	55	30	D	154	4077	74	10	1692	7,980	7,980	100%	52	18	41	48	F	175	4753	116	40	2018
California Avenue off-ramp to California Avenue on-ramp	5,425	5,411	100%	14	1	62	22	C	168	1259	20	1	1353	6,355	6,354	100%	14	1	60	27	D	189	1479	25	2	1589
California Avenue on-ramp to SR 58 EB off-ramp	6,400	6,305	99%	27	2	61	21	C	195	2910	48	3	1401	7,300	7,177	98%	27	2	61	24	C	216	3312	55	3	1595
SR58 EB off-ramp to SR 99 SB off-ramp (Ming Avenue)	5,195	5,170	100%	28	2	61	21	C	223	2507	41	2	1293	5,910	5,815	98%	29	2	61	24	C	245	2819	46	2	1454
SR 99 SB off-ramp (Ming Avenue) to SR 99 SB on-ramp (Westside Parkway EB and SR 58 WB and H Street)	4,130	4,130	100%	30	2	62	17	B	254	2158	35	2	1187	4,795	4,763	99%	30	2	61	19	C	275	2471	40	2	1361
SR 99 SB on-ramp (Westside Parkway EB and SR 58 WB and H Street) to Ming Avenue on-ramp	6,180	6,180	100%	44	2	62	20	C	298	4692	76	3	1373	7,535	7,465	99%	45	3	61	24	C	320	5675	94	6	1659
Ming Avenue on-ramp to White Lane off-ramp	6,860	6,860	100%	63	6	59	28	D	361	7122	121	11	1533	8,375	8,224	98%	78	21	39	55	F	398	8769	178	48	1828
White Lane off-ramp to White Lane loop on-ramp	4,835	4,835	100%	19	1	63	19	C	380	1626	26	1	1213	6,355	6,244	98%	20	1	61	26	C	418	2094	34	2	1561
White Lane loop on-ramp to White Lane diagonal on-ramp	5,335	5,283	99%	10	1	62	21	C	390	894	15	1	1321	6,920	6,732	97%	10	1	61	28	D	428	1140	19	1	1683
White Lane diagonal on-ramp to SR 99 SB south end of the network	5,691	5,572	98%	52	2	62	22	C	442	5036	81	3	1393	7,333	7,116	97%	53	3	61	29	D	481	6426	105	6	1779
State Route 99 NB Collector-Distributor																										
SR 99 NB C-D on-ramp to SR 99 NB C-D off-ramp	3,430	3,394	99%	27	1	53	22	C	51	1319	25	1	1358	3,705	3,548	96%	27	1	52	23	C	52	1380	26	1	1419
State Route 99 SB Collector-Distributor																										
SR 58 WB C-D on-ramp to SR 99 SB C-D off-ramp	2,825	2,796	99%	13	1	52	18	C	41	526	10	1	932	3,675	3,638	99%	13	1	52	24	C	41	685	13	1	1213
SR 99 SB C-D off-ramp to SR 99 SB C-D on-ramp	775	754	97%	10	0	49	15	B	51	102	2	0	754	935	898	96%	10	0	49	18	C	51	121	2	0	898
SR 99 SB C-D on-ramp to Ming Ave off-ramp	1,840	1,761	96%	17	1	48	18	C	68	410	9	0	881	2,050	1,965	96%	17	1	48	20	C	68	457	10	0	982

Table 4-30. PM Peak Hour Measures of Effectiveness for Alternative C—Freeway Mainline Segments (2 of 2)

FREEWAY SEGMENT	YEAR 2018													YEAR 2038													
	DEMAND (vph)	SERVED (vph)	% SERVED	TRAVEL TIME (sec/veh)	DELAY TIME (sec/veh)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	CUMULATIVE TIME (sec/veh)	VEHICLE MILES (VMT)	VEHICLE HOURS (VHT)	VEHICLE DELAY (VHD)	CORSIM SERVED VOLUMES/LANES (vphl)	DEMAND (vph)	SERVED (vph)	% SERVED	TRAVEL TIME (sec/veh)	DELAY TIME (sec/veh)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	CUMULATIVE TIME (sec/veh)	VEHICLE MILES (VMT)	VEHICLE HOURS (VHT)	VEHICLE DELAY (VHD)	CORSIM SERVED VOLUMES/LANES (vphl)	
Westside Parkway EB Mainline																											
Westside Parkway west end of the network to West Beltway off-ramp	— NOT APPLICABLE —													2,210	2,210	100%	7	2	46	27	D	7	185	4	2	1134	
West Beltway off-ramp to West Beltway loop on-ramp	— NOT APPLICABLE —													1,360	1,318	97%	14	1	60	11	A	21	309	5	0	659	
West Beltway loop on-ramp to West Beltway Direct on-ramp	— NOT APPLICABLE —													2,685	2,608	97%	9	1	61	14	B	30	407	7	0	869	
West Beltway diagonal on-ramp to Allen Road off-ramp	900	857	95%	84	3	61	6	A	84	1208	20	1	429	2,940	2,850	97%	57	2	63	15	B	87	2804	45	1	950	
Allen Road off-ramp to Allen Road on-ramp	815	804	99%	32	0	64	4	A	116	457	7	0	268	2,645	2,547	96%	33	1	63	13	B	119	1450	23	1	849	
Allen Road on-ramp to Calloway Drive off-ramp	2,105	2,035	97%	58	2	63	11	A	174	2062	33	1	678	4,465	4,383	98%	60	4	61	24	C	180	4464	73	5	1461	
Calloway Drive off-ramp to Calloway Drive Loop on-ramp	1,620	1,605	99%	24	0	64	8	A	198	695	11	0	535	3,640	3,631	100%	25	1	63	19	C	204	1573	25	1	1210	
Calloway Drive Loop on-ramp to Calloway Drive diagonal on-ramp	2,360	2,293	97%	11	1	62	12	B	209	434	7	0	764	4,605	4,525	98%	12	1	59	25	C	216	857	14	1	1508	
Calloway Drive diagonal on-ramp to Coffee Road off-ramp	3,340	3,304	99%	48	2	62	17	B	258	2746	44	2	1101	5,690	5,652	99%	50	4	61	30	D	266	4722	78	6	1884	
Coffee Road off-ramp to Coffee Road loop on-ramp	2,770	2,770	100%	23	0	63	15	B	280	1109	17	0	925	4,815	4,815	100%	23	1	62	26	C	289	1929	31	1	1607	
Coffee Road loop on-ramp to Coffee Road diagonal on-ramp	3,715	3,676	99%	11	0	62	15	B	291	696	11	0	919	5,885	5,885	100%	11	1	61	24	C	300	1118	18	1	1476	
Coffee Road diagonal on-ramp to Mohawk Street off-ramp	4,535	4,476	99%	55	3	62	18	B	346	4201	68	3	1119	6,995	6,995	100%	61	8	56	31	D	361	6681	118	17	1753	
Mohawk Street off-ramp to Mohawk Street on-ramp	3,310	3,247	98%	20	1	62	17	B	366	1101	18	1	1082	5,295	5,287	100%	20	1	61	29	D	380	1790	29	1	1762	
Mohawk Street on-ramp to Truxtun Avenue off-ramp	3,965	3,864	97%	20	1	61	16	B	386	1308	21	1	1104	6,345	6,279	99%	20	1	58	29	D	401	2130	36	3	1794	
Truxtun Avenue off-ramp to SR 99 SB C-D off-ramp (SR 99 SB and Ming Avenue)	2,855	2,783	97%	82	2	63	15	B	467	3963	63	2	928	4,950	4,940	100%	84	5	61	27	D	485	7016	115	6	1647	
SR 99 SB C-D off-ramp (SR 99 SB and Ming Avenue) to H Street off-ramp	1,245	1,231	99%	37	1	64	10	A	504	802	13	0	615	2,605	2,486	95%	38	1	63	20	C	523	1620	26	1	1243	
H Street off-ramp to Real Road on-ramp	1,011	998	99%	17	0	64	8	A	522	311	5	0	499	2,248	2,132	95%	18	1	63	17	B	540	665	11	0	1066	
Real Road on-ramp to SR 99 NB and SB on-ramp	1,976	1,817	92%	10	1	60	15	B	532	314	5	0	908	3,228	2,896	90%	11	1	58	25	C	551	500	9	1	1448	
SR 99 NB and SB on-ramp to Chester Avenue on-ramp	4,025	3,835	95%	45	2	62	15	B	577	2971	48	2	1096	5,665	5,332	94%	46	3	61	22	C	597	4138	67	4	1524	
Chester Avenue on-ramp to Union Avenue off-ramp	4,710	4,483	95%	27	1	61	18	C	604	2059	34	2	1281	6,580	6,236	95%	28	2	59	26	D	625	2869	48	4	1782	
Union Avenue off-ramp to Union Avenue loop on-ramp	3,830	3,632	95%	17	1	63	19	C	620	1055	17	1	1211	5,215	4,939	95%	17	1	62	27	D	641	1434	23	1	1646	
Union Avenue loop on-ramp to Union Avenue diagonal on-ramp	4,270	4,042	95%	8	0	61	22	C	629	565	9	0	1347	5,825	5,471	94%	8	1	60	31	D	650	766	13	1	1824	
Union Avenue diagonal on-ramp to Cottonwood Road off-ramp	4,620	4,427	96%	31	2	62	24	C	660	2352	38	2	1476	6,375	6,054	95%	32	3	59	34	D	682	3218	54	5	2018	
Cottonwood Road off-ramp to Cottonwood Road on-ramp	4,110	3,923	95%	28	1	62	21	C	688	1897	30	1	1308	5,315	5,014	94%	28	1	62	27	D	710	2425	39	2	1671	
Cottonwood Road on-ramp to SR 58 east end of the network	4,445	4,235	95%	25	1	62	23	C	713	1848	30	1	1412	5,590	5,246	94%	26	1	61	29	D	736	2289	37	2	1749	
Westside Parkway WB Mainline																											
SR 58 east end of the network to Cottonwood Road off-ramp	4,030	4,030	100%	26	1	63	21	C	26	1844	29	1	1352	5,145	5,145	100%	26	1	63	28	D	26	2353	38	1	1725	
Cottonwood Road off-ramp to Cottonwood Road on-ramp	3,825	3,798	99%	18	1	63	20	C	43	1167	19	1	1266	4,870	4,870	100%	18	1	62	26	D	44	1501	24	1	1628	
Cottonwood Road on-ramp to Brundage Lane off-ramp	4,240	4,208	99%	39	2	62	23	C	82	2785	45	2	1403	5,455	5,394	99%	39	2	61	30	D	83	3570	59	4	1798	
Brundage Lane off-ramp to Brundage Lane on-ramp	3,620	3,615	100%	17	1	62	19	C	99	1067	17	1	1205	4,780	4,705	98%	17	1	61	26	C	100	1388	23	1	1568	
Brundage Lane on-ramp to Union Avenue on-ramp	3,995	3,942	99%	12	1	61	21	C	111	808	13	1	1314	5,190	5,047	97%	12	1	60	28	D	113	1034	17	1	1682	
Union Avenue on-ramp to Chester Avenue off-ramp	4,815	4,724	98%	24	2	59	26	D	135	1841	31	2	1350	5,900	5,713	97%	24	2	59	33	D	137	2228	38	4	1632	
Chester Avenue off-ramp to SR 58 WB C-D off-ramp (SR 99 NB and SB and Real Road)	4,155	3,980	96%	30	2	60	19	C	165	2000	33	2	1137	5,195	4,847	93%	30	2	60	24	C	167	2433	41	3	1385	
SR 58 WB C-D off-ramp (SR 99 NB and SB and Real Road) to SR 99 NB C-D on-ramp (SR 99 NB and H Street)	1,200	1,169	97%	113	2	64	9	A	277	2326	37	1	585	1,865	1,826	98%	114	4	63	15	B	281	3633	58	2	913	
SR99 NB C-D on-ramp (SR 99 NB and H Street) to Mohawk Street off-ramp	3,425	3,315	97%	39	2	61	18	C	316	2165	36	2	1326	4,440	4,290	97%	40	3	59	24	C	321	2794	47	4	1716	
Mohawk Street off-ramp to Truxtun Avenue on-ramp	2,775	2,709	98%	27	1	62	22	C	343	1283	21	1	1354	3,650	3,563	98%	28	2	61	29	D	349	1688	28	2	1782	
Truxtun Avenue on-ramp to Mohawk Street loop on-ramp	4,110	4,046	98%	11	1	61	22	C	355	766	13	1	1349	5,525	5,432	98%	11	1	60	30	D	360	1028	17	1	1811	
Mohawk Street loop on-ramp to Mohawk Street direct ramp	5,025	4,965	99%	14	1	62	20	C	369	1225	20	1	1241	6,730	6,652	99%	15	1	61	27	D	375	1640	27	1	1663	
Mohawk Street direct ramp to Coffee Road off-ramp	5,630	5,288	94%	43	2	61	20	C	412	3857	63	3	1175	7,705	7,235	94%	45	4	59	28	D	419	5277	90	8	1608	
Coffee Road off-ramp to Coffee Road loop on-ramp	3,685	3,559	97%	36	1	63	14	B	447	2230	35	1	890	5,595	5,546	99%	36	1	62	22	C	456	3475	56	2	1386	
Coffee Road loop on-ramp to Coffee Road direct on-ramp	3,915	3,766	96%	12	0	63	15	B	460	821	13	0	942	5,895	5,814	99%	13	1	62	23	C	468	1267	20	1	1454	
Coffee Road direct on-ramp to Calloway Drive direct off-ramp	4,325	4,183	97%	49	2	62	16	B	508	3523	57	2	1046	6,490	6,351	98%	50	3	61	25	C	518	5346	87	5	1588	
Calloway Drive direct off-ramp to Calloway Drive loop off-ramp	3,470	3,365	97%	11	0	62	14	B	520	637	10	0	841	5,540	5,402	98%	11	1	61	22	C	529	1024	17	1	1351	
Calloway Drive loop off-ramp to Calloway Drive on-ramp	2,230	2,167	97%	24	0	64	11	B	544	927	15	0	722	4,275	4,162	97%	25										

Table 4-31. AM Peak Hour Measures of Effectiveness for Alternative C—
Merging/Diverging Conditions

LOCATION	ANALYSIS TYPE	YEAR 2018			YEAR 2038		
		SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)
State Route 99 NB							
White Lane loop on-ramp	Merging	48	35.7	E	37	54.0	E
White Lane diagonal on-ramp	Merging	50	39.5	E	48	47.3	E
SR 99 NB C-D on-ramp (SR 58 WB and H Street) on-ramp	Merging	60	23.0	C	60	28.3	D
California Avenue loop on-ramp	Merging	55	33.7	D	56	35.9	E
Buck Owens Boulevard/Sillect Avenue on-ramp	Merging	61	19.1	B	58	23.9	C
White Lane off-ramp	Diverging	62	21.8	C	61	32.4	D
Ming Avenue off-ramp	Diverging	59	34.0	D	58	41.2	E
SR 99 NB C-D off-ramp (Westside Parkway WB)	Diverging	60	22.7	C	59	28.3	D
California Avenue off-ramp	Diverging	60	24.0	C	60	29.3	D
Buck Owens Boulevard/Sillect Avenue off-ramp	Diverging	60	22.2	C	59	26.3	C
Airport Drive off-ramp	Diverging	56	25.5	C	54	32.2	D
Ming Avenue on-ramp to SR-58 off-ramp	Weaving	58	27.4	C	57	32.6	D
California Avenue diagonal on-ramp to Rosedale Highway off-ramp	Weaving	57	24.6	C	55	32.0	D
State Route 99 SB							
Airport Drive on-ramp	Merging	61	21.8	C	59	27.3	C
Rosedale Highway loop on-ramp	Merging	55	20.7	C	52	24.6	C
Rosedale Highway diagonal on-ramp	Merging	58	25.6	C	56	29.2	D
SR 99 SB C-D on-ramp (WSP EB and SR 58 WB and H Street)	Merging	61	15.2	B	60	19.9	B
Ming Avenue on-ramp	Merging	60	25.0	C	55	38.4	E
White Lane loop on-ramp	Merging	61	16.8	B	61	21.3	C
White Lane diagonal on-ramp	Merging	61	18.3	B	60	23.4	C
Rosedale Highway off-ramp	Diverging	61	21.0	C	59	27.1	C
California Avenue off-ramp	Diverging	58	31.7	D	56	39.5	E
SR 99 SB C-D off-ramp (Ming Avenue)	Diverging	61	19.7	B	61	21.3	C
White Lane off-ramp	Diverging	60	20.5	C	51	30.3	D
California Avenue on-ramp to SR 58 EB off-ramp	Weaving	61	16.9	B	61	18.3	B
Westside Parkway/State Route 58 EB							
West Beltway loop on-ramp	Merging	— NOT APPLICABLE —			61	16.2	B
West Beltway diagonal on-ramp	Merging	— NOT APPLICABLE —			62	19.6	B
Allen Road on-ramp	Merging	60	18.7	B	53	33.3	D
Calloway Drive loop on-ramp	Merging	60	19.2	B	57	30.1	D
Calloway Drive diagonal on-ramp	Merging	58	23.0	C	55	32.7	D
Real Road on-ramp	Merging	62	14.6	B	60	21.5	C
SR 99 NB and SB on-ramp	Merging	62	14.5	B	62	17.2	B
Union Avenue loop on-ramp	Merging	61	20.3	C	61	25.5	C
Union Avenue diagonal on-ramp	Merging	61	23.1	C	60	28.8	D
Cottonwood Road on-ramp	Merging	61	18.8	B	61	24.2	C
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			46	24.9	C
Allen Road off-ramp	Diverging	65	4.7	A	62	20.1	C
Calloway Drive off-ramp	Diverging	62	18.4	B	60	31.1	D
Coffee Road off-ramp	Diverging	61	26.2	C	60	35.8	E
SR 99 SB C-D off-ramp (SR 99 SB and Ming Avenue)	Diverging	62	13.0	B	61	21.2	C
H Street off-ramp	Diverging	63	10.6	B	62	15.7	B
Cottonwood Road off-ramp	Diverging	61	23.0	C	61	28.5	D
Coffee Road Loop on-ramp to Mohawk Street off-ramp	Weaving	60	20.0	C	54	31.1	D
Mohawk Street on-ramp to Truxtun Avenue off-ramp	Weaving	60	18.5	B	55	25.9	D
Chester Avenue on-ramp to Union Avenue off-ramp	Weaving	61	17.9	B	60	22.5	C
Westside Parkway/State Route 58 WB							
Brundage Lane on-ramp (Cottonwood Rd)	Merging	62	19.9	B	61	30.0	D
Brundage Lane on-ramp (Union Ave)	Merging	61	20.6	C	60	28.7	D
Union Avenue on-ramp	Merging	59	27.3	C	54	34.5	D
Truxtun Avenue on-ramp	Merging	62	17.0	B	61	23.2	C
Mohawk Street loop on-ramp	Merging	62	12.0	B	62	15.0	B
Mohawk Street diagonal on-ramp	Merging	62	11.8	B	61	15.9	B
Coffee Road loop on-ramp	Merging	63	9.1	A	63	12.9	B
Calloway Drive on-ramp	Merging	63	10.3	B	61	19.3	B
Allen Road on-ramp	Merging	63	4.6	A	62	14.1	B
West Beltway loop on-ramp	Merging	— NOT APPLICABLE —			62	10.2	B
West Beltway diagonal on-ramp	Merging	— NOT APPLICABLE —			60	13.0	B
Brundage Lane off-ramp (Cottonwood Road)	Diverging	64	18.1	B	63	27.1	C
Brundage Lane off-ramp (Union Avenue)	Diverging	62	21.6	C	61	31.5	D
Chester Avenue off-ramp	Diverging	— NOT APPLICABLE —			60	23.7	C
SR 58 WB C-D off-ramp (SR99 NB and SB and Real Road)	Diverging	60	14.7	B	60	20.7	C
Coffee Road off-ramp	Diverging	61	15.5	B	60	20.0	C
Allen Road off-ramp	Diverging	62	8.5	A	61	21.3	C
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			61	13.1	B
SR 99 NB C-D on-ramp (SR99 NB and H Street) to Mohawk Street off-ramp	Weaving	61	16.3	B	60	23.4	C
Coffee Road diagonal on-ramp to Calloway Drive loop off-ramp	Weaving	63	12.5	B	62	15.5	B

Note: Merge/diverge calculations are based on 1,500 feet from on-/off-ramp. These calculations also include the two right-most mainline lanes within 1,500 feet.

**Table 4-32. PM Peak Hour Measures of Effectiveness for Alternative C—
Merging/Diverging Conditions**

LOCATION	ANALYSIS TYPE	YEAR 2018			YEAR 2038		
		SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)	SPEED (mph)	DENSITY (veh/ln/mi)	LOS (HCM 2000)
State Route 99 NB							
White Lane loop on-ramp	Merging	54	27.6	C	44	40.2	E
White Lane diagonal on-ramp	Merging	55	31.9	D	51	42.1	E
SR 99 NB C-D on-ramp (SR 58 WB and H Street) on-ramp	Merging	61	16.7	B	61	24.0	C
California Avenue loop on-ramp	Merging	56	29.7	D	56	34.6	D
Buck Owens Boulevard/Sillect Avenue on-ramp	Merging	59	21.3	C	57	27.9	C
White Lane off-ramp	Diverging	63	19.9	B	61	30.6	D
Ming Avenue off-ramp	Diverging	60	30.2	D	58	38.1	E
SR 99 NB C-D off-ramp (Westside Parkway WB)	Diverging	60	20.1	C	59	25.2	C
California Avenue off-ramp	Diverging	61	17.3	B	61	24.6	C
Buck Owens Boulevard/Sillect Avenue off-ramp	Diverging	61	19.9	B	59	26.1	C
Airport Drive off-ramp	Diverging	56	25.8	C	55	33.0	D
Ming Avenue on-ramp to SR-58 off-ramp	Weaving	58	24.3	C	58	33.4	D
California Avenue diagonal on-ramp to Rosedale Highway off-ramp	Weaving	57	23.3	C	55	32.1	D
State Route 99 SB							
Airport Drive on-ramp	Merging	60	27.9	C	51	42.3	E
Rosedale Highway loop on-ramp	Merging	47	32.3	D	36	45.4	E
Rosedale Highway diagonal on-ramp	Merging	53	36.3	E	36	59.2	F
SR 99 SB C-D on-ramp (WSP EB and SR 58 WB and H Street)	Merging	60	21.1	C	59	25.7	C
Ming Avenue on-ramp	Merging	57	35.9	E	32	67.8	F
White Lane loop on-ramp	Merging	59	23.7	C	59	26.6	C
White Lane diagonal on-ramp	Merging	60	25.4	C	59	29.7	D
Rosedale Highway off-ramp	Diverging	61	26.0	C	55	33.2	D
California Avenue off-ramp	Diverging	52	44.4	E	36	66.8	F
SR 99 SB C-D off-ramp (Ming Avenue)	Diverging	60	28.0	C	60	27.8	C
White Lane off-ramp	Diverging	56	29.5	D	26	65.5	F
California Avenue on-ramp to SR 58 EB off-ramp	Weaving	60	23.8	C	59	23.9	C
Westside Parkway/State Route 58 EB							
West Beltway loop on-ramp	Merging	— NOT APPLICABLE —			61	14.3	B
West Beltway diagonal on-ramp	Merging	— NOT APPLICABLE —			62	17.3	B
Allen Road on-ramp	Merging	61	13.9	B	55	30.5	D
Calloway Drive loop on-ramp	Merging	61	15.7	B	58	29.0	D
Calloway Drive diagonal on-ramp	Merging	61	18.8	B	57	30.7	D
Real Road on-ramp	Merging	60	15.0	B	58	24.8	C
SR 99 NB and SB on-ramp	Merging	62	15.4	B	62	20.6	C
Union Avenue loop on-ramp	Merging	60	24.3	C	58	32.4	D
Union Avenue diagonal on-ramp	Merging	60	27.4	C	57	36.2	E
Cottonwood Road on-ramp	Merging	61	24.1	C	60	28.5	D
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			43	26.7	C
Allen Road off-ramp	Diverging	64	4.5	A	62	17.6	B
Calloway Drive off-ramp	Diverging	62	14.2	B	61	27.9	C
Coffee Road off-ramp	Diverging	62	22.7	C	60	34.3	D
SR 99 SB C-D off-ramp (SR 99 SB and Ming Avenue)	Diverging	62	15.1	B	60	27.2	C
H Street off-ramp	Diverging	63	9.7	A	62	19.9	B
Cottonwood Road off-ramp	Diverging	61	27.1	C	59	38.0	E
Coffee Road Loop on-ramp to Mohawk Street off-ramp	Weaving	61	19.1	B	56	30.8	D
Mohawk Street on-ramp to Truxtun Avenue off-ramp	Weaving	60	18.2	B	57	32.9	D
Chester Avenue on-ramp to Union Avenue off-ramp	Weaving	60	19.8	B	58	27.5	C
Westside Parkway/State Route 58 WB							
Brundage Lane on-ramp (Cottonwood Rd)	Merging	62	23.2	C	60	30.4	D
Brundage Lane on-ramp (Union Ave)	Merging	58	30.8	D	60	29.4	D
Union Avenue on-ramp	Merging	57	30.6	D	57	35.9	E
Truxtun Avenue on-ramp	Merging	61	22.1	C	60	30.3	D
Mohawk Street loop on-ramp	Merging	62	18.0	B	61	24.9	C
Mohawk Street diagonal on-ramp	Merging	61	17.0	B	59	25.9	C
Coffee Road loop on-ramp	Merging	62	13.8	B	62	21.6	C
Calloway Drive on-ramp	Merging	61	16.8	B	57	33.3	D
Allen Road on-ramp	Merging	63	6.0	A	61	19.3	B
West Beltway loop on-ramp	Merging				61	15.1	B
West Beltway diagonal on-ramp	Merging				57	19.2	B
Brundage Lane off-ramp (Cottonwood Road)	Diverging	63	20.2	C	63	26.5	C
Brundage Lane off-ramp (Union Avenue)	Diverging	62	24.6	C	61	31.5	D
Chester Avenue off-ramp	Diverging	— NOT APPLICABLE —			59	35.7	E
SR 58 WB C-D off-ramp (SR99 NB and SB and Real Road)	Diverging	61	16.9	B	61	20.8	C
Coffee Road off-ramp	Diverging	61	19.7	B	59	25.3	C
Allen Road off-ramp	Diverging	61	14.2	B	59	24.2	C
West Beltway off-ramp	Diverging	— NOT APPLICABLE —			61	19.6	B
SR 99 NB C-D on-ramp (SR99 NB and H Street) to Mohawk Street off-ramp	Weaving	61	20.8	C	60	27.5	C
Coffee Road diagonal on-ramp to Calloway Drive loop off-ramp	Weaving	61	15.8	B	60	24.0	C

Table 4-33. AM Peak Hour Measures of Effectiveness for Alternative C—On-Ramp and Off-Ramp Performance (1 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038			
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)
State Route 99 NB Off-ramps								
White Lane	695	686	99%	61	1,085	1,076	99%	48
Ming Avenue	735	735	100%	53	895	884	99%	53
SR 58 EB	1,155	1,155	100%	53	1,295	1,295	100%	53
SR 99 NB C-D (Westside Parkway WB)	1,645	1,568	95%	54	1,735	1,735	100%	54
California Avenue	965	965	100%	52	1,050	1,014	97%	52
Rosedale Highway	1,615	1,615	100%	53	1,765	1,709	97%	53
Buck Owens Boulevard/Sillect Avenue	560	560	100%	53	815	772	95%	52
Airport Drive	1,525	1,521	100%	52	1,760	1,741	99%	51
State Route 99 NB On-ramps								
White Lane loop	1,620	1,620	100%	42	1,650	1,650	100%	41
White Lane diagonal	715	695	97%	52	700	656	94%	52
Ming Avenue	1,355	1,355	100%	51	1,575	1,575	100%	52
SR 99 NB C-D (SR 58 WB and H Street)	1,255	1,255	100%	51	1,105	1,061	96%	52
California Avenue loop	835	767	92%	50	930	747	80%	51
California Avenue diagonal	385	292	76%	51	435	348	80%	51
Buck Owens Boulevard/Sillect Avenue	420	383	91%	34	675	666	99%	30
State Route 99 SB Off-ramps								
Rosedale Highway	670	670	100%	55	1,360	1,332	98%	53
California Avenue	1,125	1,095	97%	52	1,415	1,400	99%	50
SR 58 EB	795	795	100%	55	920	920	100%	54
SR 99 SB C-D (Ming Avenue)	730	692	95%	53	800	800	100%	53
White Lane	1,415	1,371	97%	54	1,685	1,664	99%	16
State Route 99 SB On-ramps								
Airport Drive	1,285	1,205	94%	49	1,410	1,361	97%	48
Rosedale Highway loop	920	920	100%	38	1,090	1,090	100%	34
Rosedale Highway diagonal	545	542	99%	40	650	639	98%	39
California Avenue	435	417	96%	51	525	504	96%	51
SR 99 SB C-D (SR 58 WB and H Street)	1,455	1,411	97%	54	2,450	2,401	98%	53
Ming Avenue	500	500	100%	51	795	795	100%	50
White Lane loop	190	183	96%	53	260	254	98%	53
White Lane diagonal	375	349	93%	53	450	410	91%	53
State Route 99 NB Collector-Distributor Off-/On-ramps								
SR 99 NB C-D on-ramp	1,645	1,568	95%	54	1,735	1,735	100%	54
SR 99 NB C-D off-ramp	1,255	1,255	100%	51	1,105	1,060	96%	52
State Route 99 SB Collector-Distributor Off-/On-ramps								
SR 58 WB on-ramp	1,080	1,055	98%	40	1,375	1,338	97%	40
SR 99 SB off-ramp	1,455	1,411	97%	54	2,450	2,401	98%	53
SR 99 SB on-ramp	730	691	95%	48	800	800	100%	47
Ming Avenue off-ramp	1,475	1,409	96%	49	1,670	1,665	100%	48

Table 4-33. AM Peak Hour Measures of Effectiveness for Alternative C—On-Ramp and Off-Ramp Performance (2 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038				
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	
Westside Parkway/State Route 58 EB Off-ramps									
West Beltway	— NOT APPLICABLE —					685	685	100%	50
Allen Road	55	50	91%	55	360	360	100%	53	
Calloway Drive	540	482	89%	54	975	944	97%	53	
Coffee Road	670	637	95%	53	1,050	1,050	100%	53	
Mohawk Street	1,475	1,445	98%	54	1,890	1,878	99%	54	
Truxtun Avenue	1,405	1,405	100%	54	1,550	1,550	100%	54	
SR 99 SB/Ming Avenue C-D	1,120	1,076	96%	54	1,945	1,900	98%	53	
H Street	457	411	90%	54	340	334	98%	54	
Union Avenue	810	810	100%	54	1,050	1,008	96%	54	
Cottonwood Road	530	530	100%	53	645	644	100%	53	
Westside Parkway/State Route 58 EB On-ramps									
West Beltway loop	— NOT APPLICABLE —					1,475	1,459	99%	53
West Beltway diagonal	— NOT APPLICABLE —					280	258	92%	54
Allen Road	1,725	1,725	100%	40	1,990	1,990	100%	39	
Calloway Drive loop	750	718	96%	53	920	920	100%	53	
Calloway Drive diagonal	1,095	1,095	100%	51	1,100	1,100	100%	51	
Coffee Drive loop	880	847	96%	53	950	942	99%	53	
Coffee Road diagonal	605	556	92%	53	1,075	1,073	100%	53	
Mohawk Street	520	520	100%	48	475	459	97%	49	
Real Road	920	920	100%	58	955	955	100%	57	
SR 99 NB and SR 99 SB	1,742	1,742	100%	51	1,895	1,895	100%	50	
Chester Avenue	495	466	94%	52	650	650	100%	51	
Union Avenue loop	265	249	94%	53	300	291	97%	53	
Union Avenue diagonal	250	240	96%	52	290	281	97%	52	
Cottonwood Road	225	225	100%	52	310	307	99%	52	
Westside Parkway/State Route 58 WB Off-ramps									
Cottonwood Road	200	189	95%	54	200	200	100%	54	
Brundage Lane	540	540	100%	52	825	791	96%	39	
Chester Avenue	675	598	89%	54	825	783	95%	54	
SR 99 NB and SB/Real Road	2,770	2,770	100%	53	3,255	3,203	98%	52	
Mohawk Street	645	625	97%	53	890	890	100%	52	
Coffee Road	1,720	1,720	100%	54	2,170	2,074	96%	53	
Calloway Drive diagonal	660	587	89%	54	585	563	96%	54	
Calloway Drive loop	955	910	95%	53	725	678	94%	53	
Allen Road	1,075	1,030	96%	54	1,140	1,098	96%	52	
West Beltway	— NOT APPLICABLE —					1,485	1,431	96%	53
Westside Parkway/State Route 58 WB On-ramps									
Cottonwood Road	290	268	92%	51	375	364	97%	51	
Brundage Lane	450	385	86%	49	500	500	100%	49	
Union Avenue	570	570	100%	51	770	770	100%	51	
SR 99 NB/H Street	2,120	2,074	98%	47	2,385	2,385	100%	40	
Truxtun Avenue	940	934	99%	51	1,000	977	98%	51	
Mohawk Street loop	555	495	89%	51	625	620	99%	51	
Mohawk Street diagonal	495	483	98%	52	810	783	97%	51	
Coffee Road loop	155	133	86%	55	180	174	97%	55	
Coffee Road direct	270	270	100%	54	310	310	100%	54	
Calloway Drive	315	315	100%	53	550	529	96%	53	
Allen Road	105	105	100%	52	370	370	100%	52	
West Beltway loop	— NOT APPLICABLE —					300	300	100%	54
West Beltway diagonal	— NOT APPLICABLE —					295	285	97%	54
Westside Parkway WB Collector-Distributor Off-/On-ramps									
H Street on-ramp	515	501	97%	51	650	625	96%	51	
SR 58 WB C-D on-ramp	2,770	2,770	100%	53	3,255	3,203	98%	52	
SR 99 SB off-ramp	1,730	1,730	100%	53	1,755	1,677	96%	53	
SR 99 SB off-ramp	1,080	1,054	98%	42	1,375	1,338	97%	41	
Real Road off-ramp	475	461	97%	50	775	775	100%	49	

Table 4-34. PM Peak Hour Measures of Effectiveness for Alternative C—On-Ramp and Off-Ramp Performance (1 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038			
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)
State Route 99 NB Off-ramps								
White Lane	680	680	100%	62	1,105	1,105	100%	58
Ming Avenue	805	785	98%	53	885	880	99%	53
SR 58 EB	1,330	1,265	95%	53	1,435	1,404	98%	53
SR 99 NB C-D (Westside Parkway WB)	1,735	1,705	98%	54	1,870	1,760	94%	53
California Avenue	600	593	99%	52	655	655	100%	52
Rosedale Highway	1,580	1,563	99%	53	1,670	1,563	94%	53
Buck Owens Boulevard/Sillect Avenue	320	318	99%	52	375	339	90%	52
Airport Drive	1,340	1,284	96%	52	1,420	1,300	92%	52
State Route 99 NB On-ramps								
White Lane loop	1,460	1,349	92%	44	1,635	1,447	89%	44
White Lane diagonal	595	594	100%	52	680	680	100%	52
Ming Avenue	1,275	1,275	100%	51	1,520	1,520	100%	52
SR 99 NB C-D (SR 58 WB and H Street)	1,205	1,205	100%	51	1,130	1,089	96%	52
California Avenue loop	860	741	86%	51	1,310	836	64%	51
California Avenue diagonal	625	478	76%	51	835	621	74%	50
Buck Owens Boulevard/Sillect Avenue	730	705	97%	32	755	755	100%	31
State Route 99 SB Off-ramps								
Rosedale Highway	700	700	100%	54	1,300	1,291	99%	53
California Avenue	1,355	1,355	100%	49	1,625	1,625	100%	28
SR 58 EB	1,205	1,140	95%	54	1,390	1,373	99%	54
SR 99 SB C-D (Ming Avenue)	1,065	1,014	95%	53	1,115	1,062	95%	53
White Lane	2,025	2,025	100%	53	2,020	1,836	91%	15
State Route 99 SB On-ramps								
Airport Drive	1,790	1,790	100%	46	2,055	2,055	100%	37
Rosedale Highway loop	1,330	1,330	100%	32	1,370	1,370	100%	31
Rosedale Highway diagonal	820	783	95%	39	1,060	1,008	95%	36
California Avenue	975	898	92%	51	945	836	88%	51
SR 99 SB C-D (SR 58 WB and H Street)	2,050	2,040	100%	54	2,740	2,733	100%	53
Ming Avenue	680	680	100%	51	840	840	100%	51
White Lane loop	500	468	94%	51	565	542	96%	51
White Lane diagonal	475	456	96%	53	630	563	89%	53
State Route 99 NB Collector-Distributor Off-/On-ramps								
SR 99 NB C-D on-ramp	1,735	1,705	98%	54	1,870	1,760	94%	53
SR 99 NB C-D off-ramp	1,205	1,205	100%	52	1,130	1,090	96%	52
State Route 99 SB Collector-Distributor Off-/On-ramps								
SR 58 WB on-ramp	1,215	1,215	100%	40	1,330	1,232	93%	40
SR 99 SB off-ramp	2,050	2,040	100%	54	2,740	2,733	100%	53
SR 99 SB on-ramp	1,065	1,012	95%	47	1,115	1,064	95%	47
Ming Avenue off-ramp	1,840	1,761	96%	48	2,050	1,967	96%	48

Table 4-34. PM Peak Hour Measures of Effectiveness for Alternative C—On-Ramp and Off-Ramp Performance (2 of 2)

FREEWAY RAMPS	YEAR 2018				YEAR 2038			
	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)	DEMAND VOLUME (vph)	CORSIM SERVED VOLUME (vph)	PERCENTAGE SERVED IN CORSIM MODEL (%)	SPEED (mph)
Westside Parkway/State Route 58 EB Off-ramps								
West Beltway	— NOT APPLICABLE —				850	850	100%	49
Allen Road	85	73	86%	53	295	295	100%	54
Calloway Drive	485	439	91%	54	825	764	93%	53
Coffee Road	570	528	93%	53	875	856	98%	53
Mohawk Street	1,225	1,194	97%	54	1,700	1,700	100%	54
Truxtun Avenue	1,110	1,067	96%	55	1,395	1,311	94%	54
SR 99 SB/Ming Avenue C-D	1,610	1,550	96%	53	2,345	2,345	100%	53
H Street	234	232	99%	54	357	348	97%	54
Union Avenue	880	832	95%	54	1,365	1,329	97%	45
Cottonwood Road	510	498	98%	54	1,060	1,050	99%	53
Westside Parkway/State Route 58 EB On-ramps								
West Beltway loop	— NOT APPLICABLE —				1,325	1,290	97%	48
West Beltway diagonal	— NOT APPLICABLE —				255	250	98%	54
Allen Road	1,290	1,260	98%	46	1,820	1,820	100%	43
Calloway Drive loop	740	721	97%	47	965	965	100%	47
Calloway Drive diagonal	980	979	100%	52	1,085	1,056	97%	51
Coffee Drive loop	945	904	96%	47	1,070	1,070	100%	47
Coffee Road diagonal	820	814	99%	53	1,110	1,110	100%	53
Mohawk Street	655	613	94%	43	1,050	1,002	95%	43
Real Road	965	874	91%	58	980	940	96%	58
SR 99 NB and SR 99 SB	2,049	1,962	96%	50	2,437	2,381	98%	50
Chester Avenue	685	677	99%	51	915	915	100%	51
Union Avenue loop	440	440	100%	53	610	610	100%	53
Union Avenue diagonal	350	350	100%	52	550	526	96%	52
Cottonwood Road	335	327	98%	52	275	249	91%	52
Westside Parkway/State Route 58 WB Off-ramps								
Cottonwood Road	205	205	100%	54	275	253	92%	55
Brundage Lane	620	606	98%	52	675	675	100%	52
Chester Avenue	660	657	100%	53	705	700	99%	53
SR 99 NB and SB/Real Road	2,955	2,930	99%	53	3,330	3,213	96%	52
Mohawk Street	650	596	92%	53	790	720	91%	53
Coffee Road	1,945	1,918	99%	54	2,110	2,006	95%	53
Calloway Drive diagonal	855	809	95%	53	950	906	95%	53
Calloway Drive loop	1,240	1,193	96%	52	1,265	1,235	98%	53
Allen Road	1,830	1,736	95%	53	2,100	1,982	94%	51
West Beltway	— NOT APPLICABLE —				2,220	2,129	96%	53
Westside Parkway/State Route 58 WB On-ramps								
Cottonwood Road	415	415	100%	50	585	553	95%	50
Brundage Lane	375	350	93%	49	410	400	98%	49
Union Avenue	820	810	99%	51	710	684	96%	51
SR 99 NB/H Street	2,225	2,145	96%	47	2,575	2,470	96%	40
Truxtun Avenue	1,335	1,335	100%	50	1,875	1,874	100%	49
Mohawk Street loop	915	915	100%	47	1,205	1,205	100%	47
Mohawk Street diagonal	605	534	88%	51	975	951	98%	51
Coffee Road loop	230	213	93%	51	300	288	96%	51
Coffee Road direct	410	410	100%	54	595	552	93%	54
Calloway Drive	520	519	100%	52	1,055	1,043	99%	53
Allen Road	75	75	100%	51	445	427	96%	51
West Beltway loop	— NOT APPLICABLE —				475	468	99%	48
West Beltway diagonal	— NOT APPLICABLE —				375	354	94%	53
Westside Parkway WB Collector-Distributor Off-/On-ramps								
H Street on-ramp	615	615	100%	52	705	693	98%	51
SR 58 WB C-D on-ramp	2,955	2,930	99%	53	3,330	3,213	96%	52
SR 99 SB off-ramp	1,695	1,695	100%	54	1,835	1,795	98%	53
SR 99 SB off-ramp	1,215	1,215	100%	42	1,330	1,228	92%	42
Real Road off-ramp	660	613	93%	49	870	870	100%	49

Table 4-35. Ramp Termini and Intersection Level of Service for Alternative C (1 of 3)

INTERSECTION	SIGNAL CONTROL	YEAR 2018				YEAR 2038			
		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
		LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)
1. I-5 SB ramps/Stockdale Highway	NB/SB two-way stop	A	3.6	A	7.5	A	5.4	F	52.1
	Imp-Signal*	N/A				B	11.7	B	11.3
2. I-5 NB ramps/Stockdale Highway	NB/SB two-way stop	A	3.5	A	9.9	A	4.0	B	11.6
3. SR 43 (Enos Lane)/Rosedale Highway	4-way stop	B	14.9	D	32.1	D	28.1	F	83.1
	Imp-Signal	N/A				C	26.9	C	33.0
4. SR 43 (Enos Lane)/Stockdale Highway	4-way stop	F	53.6	F	82.3	F	>150	F	>150
	Imp-Signal	C	20.1	C	21.9	B	15.9	C	29.8
5. SR 43 (Enos Lane)/I-5 NB ramps	EB/WB two-way stop	A	4.5	B	12.2	A	3.3	B	13.5
6. SR 43 (Enos Lane)/I-5 SB ramps	EB/WB two-way stop	A	8.7	C	15.5	A	4.6	C	18.1
7. Stockdale Highway/Nord Road	Signal	D	36.7	C	29.8	C	34.6	C	22.1
8. Stockdale Highway/Wegis Avenue	NB/SB two-way stop	A	7.0	B	11.1	F	>150	F	>150
	Imp-Signal*	N/A				C	27.8	C	33.0
9. Stockdale Highway/Heath Road	Stop (existing) Signal (future)	B	17.0	B	20.0	C	28.5	C	23.6
10. Stockdale Highway/Westside Parkway	Signal	A	6.2	B	14.2	A	9.5	A	6.4
11. West Beltway/Westside Parkway WB ramp	Signal	Does not exist in 2018				A	9.6	B	16.3
12. West Beltway/Westside Parkway EB ramp	Signal	Does not exist in 2018				A	7.9	B	14.2
13. Allen Road/Rosedale Highway	Signal*	C	32.1	D	41.1	D	36.2	D	47.3
14. Allen Road/Brimhall Road	Signal	C	26.0	C	30.0	C	26.9	C	27.8
15. Allen Road/Westside Parkway WB ramps	Signal	B	17.6	C	27.6	B	19.3	C	20.5
16. Allen Road/Westside Parkway EB ramps	Signal	B	17.8	A	9.7	B	17.1	B	13.8
17. Allen Road/San Juan Avenue	Signal*	C	25.5	C	20.1	C	24.9	C	22.1
18. Allen Road/Stockdale Highway	Signal	C	24.1	C	26.6	C	33.6	C	28.1
19. Calloway Drive/Rosedale Highway	Signal*	D	52.0	D	38.5	D	54.3	E	61.8
20. Calloway Drive/Brimhall Road	Signal	C	29.7	C	30.6	C	31.7	C	31.2
21. Calloway Drive/Westside Parkway WB ramps	Signal	B	15.4	B	15.7	B	14.2	C	20.2
22. Calloway Drive/Westside Parkway EB ramps	Signal	B	13.5	A	7.8	B	13.5	A	8.7
23. Calloway Drive/Stockdale Highway	Signal	D	43.1	C	9.4	D	44.0	D	35.9
24. Coffee Road/Rosedale Highway*	Signal*	D	41.0	F	129.4	E	65.3	F	94.2

Table 4-35. Ramp Termini and Intersection Level of Service for Alternative C (2 of 3)

INTERSECTION	SIGNAL CONTROL	YEAR 2018				YEAR 2038			
		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
		LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)
25. Coffee Road/Brimhall Road	Signal	C	24.7	C	24.5	C	27.6	C	31.1
26. Coffee Road/Westside Parkway WB ramps	Unsignalized	N/A				N/A			
27. Coffee Road/Westside Parkway EB ramps	Signal	B	16.6	A	8.8	B	11.1	B	14.1
28. Coffee Road/Truxtun Avenue	Signal	B	13.5	B	14.0	B	12.5	B	17.8
29. Coffee Road/Stockdale Highway	Signal*	D	38.4	D	50.0	E	65.3	F	103.9
30. Mohawk Street/Rosedale Highway	Stop (existing)* Signal (future)*	E	68.6	F	138.5	E	76.8	F	106.0
31. Mohawk Street/WSP WB ramps	Signal	A	9.7	A	8.1	B	11.4	A	8.0
32. Mohawk Street/WSP EB ramps	Signal	C	23.4	B	19.7	B	18.2	B	14.4
33. Mohawk Street/Truxtun Avenue	Signal	C	29.5	C	26.0	C	33.5	C	29.7
34. Mohawk Street/California Avenue	Signal*	C	28.7	E	55.9	D	38.1	F	81.7
35. Stockdale Highway/California Avenue	Signal*	D	42.6	E	61.5	D	43.3	E	64.4
36. Airport Drive/State Road–SR 204 off-ramp	Signal	C	21.7	C	22.1	C	21.5	C	21.9
37. Airport Drive/SR 99 NB ramp	Signal	A	9.1	B	12.0	A	8.9	B	11.0
38. Buck Owens Boulevard/Rio Mirada Drive	Signal	C	30.6	C	24.2	C	32.6	C	27.5
39. SR 99 NB ramps/Buck Owens Boulevard	Signal	D	37.5	D	45.5	D	42.4	D	42.6
40. Rosedale Highway/Camino Del Rio Court	Signal	C	23.7	D	41.9	C	32.8	D	46.4
41. Rosedale Highway/SR 99 SB ramps	Signal	B	15.3	B	15.9	C	20.7	C	22.6
42. Rosedale Highway/SR99 NB ramps	Signal	C	28.1	C	28.8	C	26.1	D	37.7
43. 24th Street/Oak Street	Signal	C	26.4	C	29.7	C	30.4	D	36.9
44. Truxtun Avenue/Empire Drive	Signal*	C	32.4	C	32.3	C	23.7	C	27.7
45. Truxtun Avenue/Oak Street	Signal	C	32.3	D	43.8	D	51.8	D	48.1
46. California Avenue/Chester Lane	Signal	C	22.6	D	51.9	C	21.1	F	121.3
47. California Avenue/SR 99 SB ramps	Signal	D	41.7	E	62.3	E	58.9	F	83.2
48. California Avenue/SR 99 NB ramps	Signal	C	26.6	C	25.1	C	30.7	C	24.5
49. California Avenue/Oak Street	Signal	C	31.5	D	39.8	C	28.2	E	58.1
50. Stockdale Highway/Stine Road	Signal*	C	22.6	D	52.0	C	34.2	F	80.8
51. Stockdale Highway/Real Road	Signal	D	50.9	F	81.8	D	45.2	F	91.3
52. Stockdale Highway/SR 99 SB ramp	Signal	Intersection does not exist in Alternative C							

Table 4-35. Ramp Termini and Intersection Level of Service for Alternative C (3 of 3)

INTERSECTION	SIGNAL CONTROL	YEAR 2018				YEAR 2038			
		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
		LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)	LOS	AVG DELAY (sec/veh)
53. Brundage Lane/Oak Street	Signal	C	27.3	C	29.9	C	29.9	C	30.6
54. Real Road/SR 58	Signal	C	22.7	C	26.7	C	21.1	D	39.9
55. Wible Road/SR 99 NB ramps	Signal	Intersection does not exist in Alternative C							
56. Ming Avenue/New Stine Road	Signal*	D	37.4	D	39.8	D	44.4	E	55.0
57. Ming Avenue/Real Road	Signal	C	26.5	C	33.7	C	25.7	C	28.4
58. Ming Avenue/SR 99 SB ramps	Signal	A	4.1	A	2.0	A	4.9	B	15.8
59. Ming Avenue/Wible Road	Signal	B	15.9	C	26.5	C	28.1	C	27.4
60. Ming Avenue/SR 99 NB ramps	Signal	C	28.8	C	30.2	C	33.8	C	34.5
61. Ming Avenue/Castro Lane	Signal	C	28.2	C	34.2	C	28.6	D	35.9
62. White Lane/Wible Road	Signal*	E	58.2	E	71.5	F	81.1	F	129.8
63. White Lane/SR 99 SB ramps	Signal*	B	19.7	F	85.9	C	20.9	F	93.9
64. White Lane/SR 99 NB ramps	Signal*	B	10.2	A	9.6	B	23.2	C	26.5
65. White Lane/Hughes Lane	Signal*	D	38.8	D	43.5	D	45.9	D	49.6
66. H Street/Brundage Lane	Signal	C	23.7	C	26.2	C	24.9	C	25.8
67. H Street/SR 58 WB ramp	Signal	C	26.2	C	33.8	B	14.7	D	35.9
68. H Street/SR 58 EB ramp	Signal	C	21.8	B	19.4	C	24.6	C	26.2
69. H Street/Ming Avenue	Signal*	C	29.8	D	43.2	D	36.7	D	40.8
70. Chester Avenue/Brundage Lane	Signal	C	23.9	D	36.2	C	24.9	C	25.8
71. Chester Avenue/SR 58 WB ramp	Signal	B	17.7	B	19.2	C	20.7	C	28.1
72. Chester Avenue/SR 58 EB ramp	Signal	C	26.0	B	16.5	C	27.7	C	21.8
73. Chester Avenue/Ming Avenue	Signal*	D	44.4	D	40.5	D	40.0	D	51.2
74. Union Avenue/Brundage Lane	Signal	C	34.8	C	25.1	E	56.9	D	51.0
75. Brundage Lane/SR 58 WB ramps	Signal	C	21.8	C	20.8	C	25.1	D	42.6
76. Union Avenue/SR 58 EB ramps	Signal	B	16.2	B	11.6	B	19.7	B	18.5
77. Cottonwood Road–MLK/Brundage Lane	Signal	C	22.9	C	24.1	C	23.9	C	25.2
78. Cottonwood Road–Brundage Lane/SR 58 WB ramps	Signal	C	20.8	C	24.7	C	20.2	C	33.9
79. Cottonwood Road/SR 58 EB ramps	Signal	B	12.3	B	12.1	B	12.1	B	17.4

*LOS summary based on SYNCHRO 6

Source: Parsons

4.7 Traffic Performance of the Build Transportation Systems Management/Transit Alternative

The build/transportation systems management/transit alternative investments are concentrated along Rosedale Highway, from west of Allen Road to the interchange with State Route 99. The proposed roadway configuration is illustrated on Figures 4-16 and 4-17. The transportation systems management/transit alternative is intended to increase the capacity of Rosedale Highway (State Route 58 west) and transform the facility into a higher speed, expressway-type facility. By offering reduced delays at signalized intersections, via the construction of grade separations at high volume north-south arterial streets and the removal of intermediate signalized intersections and cross traffic interruptions, motorists and commercial vehicles would be more likely to select Rosedale Highway as their route choice, thereby relieving traffic volumes and congestion on parallel routes.

The paragraphs below describe the build transportation systems management/transit alternative, moving from west to east. As mentioned in Section 3.3, low-cost intersection and transit service improvements are assumed for all build and no-build alternatives. These enhancements, common to all alternatives, are not described in this section.

From Enos Lane to Allen Road, all build and no-build alternatives assume that Rosedale Highway will be widened from two lanes (one lane per direction) to a four-lane facility. This widening is illustrated on Figure 3-4 as Project #9.

Passing Jenkins Road, the footprint of Rosedale Highway would be widened to allow for a four-lane grade separation over or under Allen Road. One-way frontage roads would be constructed to accommodate at-grade right turns in and out of adjacent driveways, Froehlich Street, and Van Buren Place. A U-turn lane would be provided at Allen Road to allow frontage road traffic to reverse their direction of travel without stopping at the at-grade intersection with Allen Road. All turns to and from Allen Road would be accommodated at grade. Figures 4-18 and 4-19 provide representative illustrations of what the grade separation options would look like at Allen Road.

Continuing east, the four-lane divided Rosedale Highway would return to grade, flanked by one or two-lane, one-way frontage roads, which would serve as on-off ramps to Rosedale Highway. Right turn in and out movements would be maintained at driveways, Central Avenue and Maher Way. East of Maher Way, the frontage roads would merge with the through traffic lanes forming a median separated six-lane facility.

From west of Lassen Drive through the Old Farm Road and Verdugo Lane intersections, past Dean Avenue and Mosasco Street, Rosedale Highway would remain the same as constructed for the no-build alternative. That is, widened from four lanes to six lanes under Project #11 identified on Figure 3-4.

After passing Mosasco Street, the six-lane roadway would split to provide two mainline lanes in each direction, descending or ascending to pass under or over Calloway Drive, flanked by one lane, transitioning to two-lane one-way frontage roads at grade. U-turn connector roads would permit reverse direction travel for vehicles entering the frontage roads. **Note that the number of through and turning lanes on the intersecting streets illustrated on Figure 4-15 are generic. Figure 3-20 must be consulted for actual intersection traffic lane requirements.**

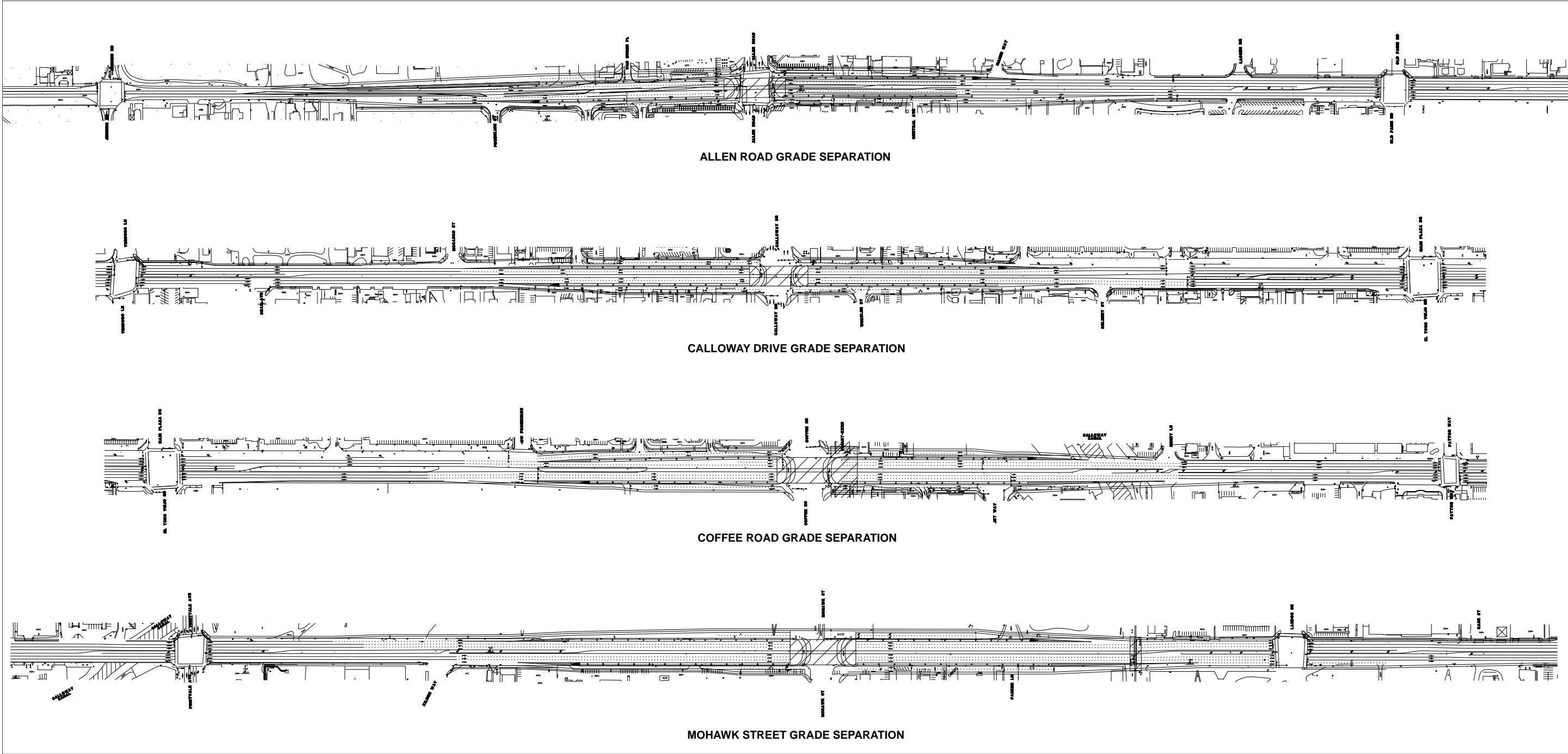


Figure 4-16: Transportation Systems Management/Transit Alternative Improvements along Rosedale Highway

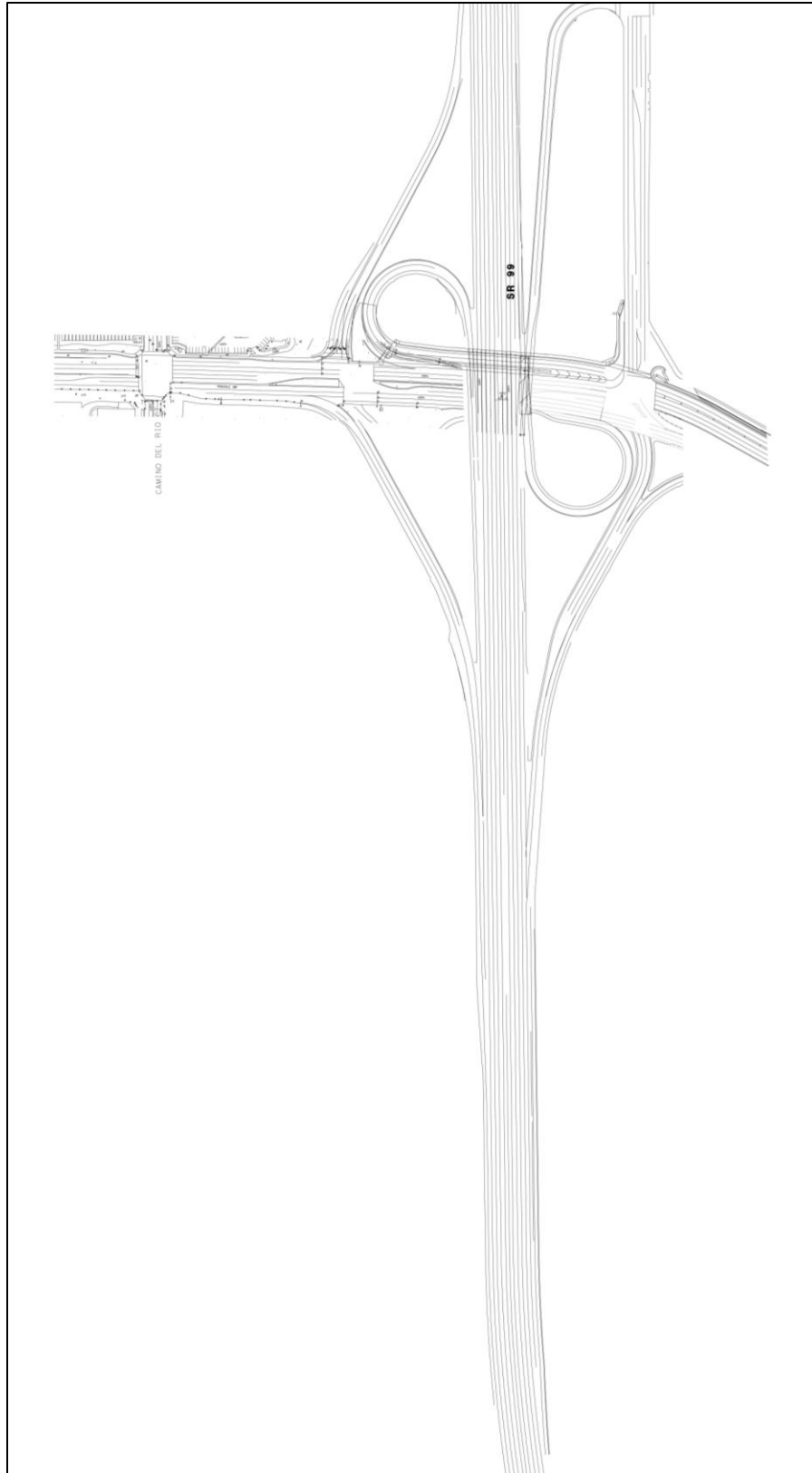


Figure 4-17: Transportation Systems Management/Transit Alternative Improvements at State Route 58/State Route 99 Interchange



Figure 4-18: Grade Separation Concept A



Figure 4-19: Grade Separation Concept B

Continuing east from Calloway Drive, access to Wheeler Street would be right-turn in and right-turn out from the eastbound one-way frontage road. The two-lane frontage roads would transition to one lane each, merging or diverging with the through traffic lanes as the latter reach grade level. East of Delbert Street, Rosedale Highway would continue as constructed (widened to six lanes) for the no-build alternative, past the various driveways to the Northwest Promenade Shopping Plaza and the signalized Main Plaza Drive/El Toro Viejo Road intersection to just west of the next main driveway to the Northwest Promenade. At this location, the six through lanes would ascend on a grade separation structure passing over Coffee Road and the Friant–Kern Canal. The grade separation would be flanked by one-way frontage roads transitioning between one and two lanes wide.

Continuing east, Jet Way would be accessed by the eastbound frontage road permitting right-turn in and right-turn out movements. Access to the Lowe's home improvement center would be via Jet Way, while convenient egress could occur via Coffee Road as existing. Upon crossing the Calloway Canal, the frontage and through lanes would merge just west of Henry Lane.

From Henry Lane east, past Patton Way and Fruitvale Avenue to Kilmer Way, Rosedale Highway would continue as widened to six lanes under the no-build alternative. East of Kilmer Way, six through movement traffic lanes would be carried over Mohawk Street on a grade separation structure, flanked by one-way frontage roads. The grade separation would continue over the San Joaquin Valley Railroad industrial lead track, which crosses Rosedale Highway just east of Parker Lane.

Approaching Landco Drive, Rosedale Highway would return to grade as constructed for the no-build alternative. This no-build, six-lane with median configuration would continue past Case Street, Fairhaven Drive and Gibson Street to the Costco westerly entrance road.

The easterly entrance road to Costco along with the opposing local street, Camino del Rio Court, would both be converted to right-turn in and right-turn out access under the build transportation systems management/transit alternative. The southbound off-ramp from State Route 99 would be widened, and an eastbound Rosedale Highway to northbound loop on-ramp to State Route 99 would be constructed as part of this alternative.

Figure 3-21, depicted earlier, indicated that Rosedale Highway is expected to attract traffic compared to the no-build alternative, based on higher speeds offered by the upgraded expressway type facility. Given this additional traffic demand, the facility will operate at LOS D, E, or F, depending on location, as illustrated on Figure 4-20. More precise analysis statistics, based on individual intersection operations is reported below.

The locations of the study area intersections along Rosedale Highway were previously illustrated on Figures 3-8, 3-19 and 3-20, along with the design year (2035 or 2038) final adjusted forecast turning movement volumes. Based on these traffic volumes and the number of traffic lanes assumed for each movement, level of service has been computed based on the criteria reported in Section 4-2.

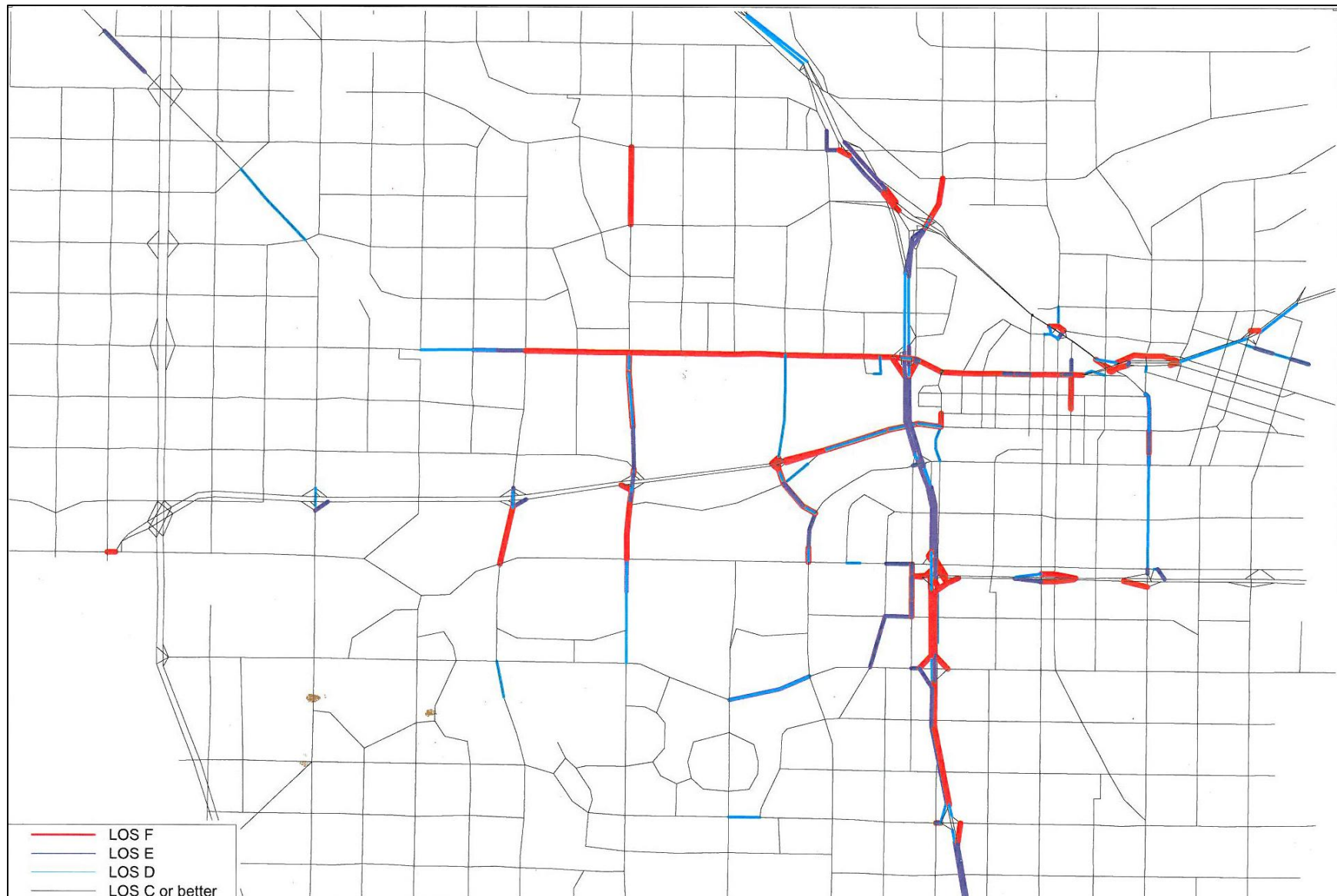


Figure 4-20: Locations of Congestion for the Transportation Systems Management/Transit Alternative

Table 4-36 summarizes the analysis results of the intersection performance under design year conditions. The first set of statistics comes from the recently completed *Rosedale (Widening Project) Traffic Operations Report*. Insofar as the design year, that analysis assumed that the Centennial Connector project (build alternative B) was constructed by 2017, and fully operational thereafter, including the 2035 horizon year assumed for the analysis. The methods used to compute the design year volumes were similar, but not identical, to those used for the no-build transportation systems management/transit (no Centennial connection) and build transportation systems management/transit scenarios. The results are therefore provided for reference purposes only.

Under the Rosedale widening scenario, which includes construction of the Centennial Connector project, Rosedale Highway would experience LOS E or LOS F conditions at its intersections with Coffee Road and Mohawk Street.

Under the no-build Centennial Connector scenario, these two intersections would continue to operate at LOS F, with increased delay. The southbound State Route 99 off-ramp terminal intersection with Rosedale Highway would additionally operate at a poor LOS E or LOS F condition.

Under the TSM alternative, Table 4-30 reports level of service conditions for two design options. The six-lane option assumes three through lanes per direction along Rosedale Highway at Fruitvale Avenue, Gibson Street, and the westerly Costco signalized intersection. Under these traffic lane assumptions, these intersections all operate at LOS E or LOS F during AM or PM peak hours or both. The southbound State Route 99 off-ramp terminal intersection with Rosedale Highway would additionally operate at LOS E during the PM peak hour.

As these performance characteristics are worse than the Caltrans District 6 LOS D design standard for a build alternative, an eight-lane option was also tested. As indicated on Figure 3-19, a fourth through lane per direction would be added to the intersections at Fruitvale Avenue, Gibson Street and the Costco entrance, including the intermediary roadway sections and grade separation structures at Mohawk Street and the San Joaquin Valley Railroad crossing located just east of Mohawk Street.

Given the addition of a fourth through lane, intersection level of service performance would improve compared to the no-build or transportation systems management/transit six-lane option. At Fruitvale Avenue, level of service would improve from LOS E to D. At Mohawk Street, no change to the at-grade intersection is proposed; hence, the level of service performance would be identical to the six-lane option (LOS D during the AM peak hour and LOS E during the PM peak hour).

At Gibson Street, level of service would improve from LOS E/F to LOS C/D during the AM/PM peak hours. At the Costco west signalized intersection, level of service would improve from LOS C/F to LOS B/C during the AM/PM peak hours.

Based on these traffic operational results, the transportation systems management/transit eight-lane option would be the appropriate definition of the build transportation systems management/transit alternative, to meet Caltrans District 6 design standards for principal arterial roadways.

Insofar as screenline traffic diversion, Section 3.4 of this traffic study report presented peak hour and daily traffic volume forecasts for the build transportation systems management/transit and no-build alternatives. Figure 3-21 was presented, indicating the difference between the 2038

Table 4-36. 2038 Peak Hour Intersection Level of Service

INTERSECTION	ROSEDALE WIDENING PROJECT (2035) ¹				NO-BUILD CENTENNIAL CORRIDOR PROJECT				TRANSPORTATION SYSTEMS MANAGEMENT/TRANSIT							
	AM		PM		AM		PM		6-LANE OPTION				8-LANE OPTION			
	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
1. Allen Road and SR 58	38.0	D	45.0	D	40.7	D	47.1	D	40.2	D	54.7	D	40.2	D	54.7	D
2. Old Farm Road and SR 58	—	—	—	—	—	—	—	—	41.2	D	38.5	D	41.2	D	38.5	D
3. Verdugo Lane and SR 58	—	—	—	—	—	—	—	—	48.7	D	37.4	D	48.7	D	37.4	D
4. Calloway Drive and SR 58	44.0	D	49.0	D	49.4	D	54.8	D	48.1	D	48.9	D	48.1	D	48.9	D
5. Main Plaza Drive/El Toro Viejo Road and SR 58	—	—	—	—	—	—	—	—	28.0	C	47.7	D	28.0	C	47.7	D
6. Coffee Road and SR 58	68.0 (58.0) ²	E (E) ²	97.0 (70.0) ²	F (E) ²	83.1	F	98.0	F	57.1	E	61.3	E	57.1	E	61.3	E
7. Fruitvale Avenue and SR 58	—	—	—	—	—	—	—	—	77.6	E	57.6	E	47.3	D	49.9	D
8. Mohawk Street and SR 58	99.0 (95.0) ²	F (F) ²	99.0 (88.0) ²	F (F) ²	116.4	F	100.2	F	41.8	D	69.1	E	41.8	D	69.1	E
9. Gibson Street and SR 58	—	—	—	—	—	—	—	—	63.3	E	117.6	F	31.7	C	35.5	D
10. Costco Entrance and SR 58	—	—	—	—	—	—	—	—	29.4	C	108.0	F	15.5	B	34.0	C
11. SR 99 southbound ramps and SR 58	14.0	B	33.0	C	60.2	E	93.7	F	23.6	C	72.8	E	9.8	A	8.8	A
12. SR 99 northbound ramps and SR 58	28.0	C	48.0	D	29.7	C	49.8	D	52.7	D	75.5	E	52.7	D	75.5	E

Source: Parsons, except where noted

1. Source: Fehr & Peers, March 2011

2. With mitigation measures delay, level of service and impact determination

transportation system management/transit and no-build daily traffic volumes, as assigned by the travel forecast model. Given the intersection level of service performance reported above, it appears that the eight-lane transportation systems management/transit option will be able to accommodate the diversion of traffic illustrated on Figure 3-21.

Table 4-37 provides a quantification of traffic diversion attributable to the transportation systems management/transit eight-lane option compared to the no-build alternative.

Table 4-37. 2038 Volume Difference—Transportation Systems Management/Transit versus No-Build

EAST–WEST FACILITY	SCREENLINE				
	WEST OF STATE ROUTE 99	WEST OF MOHAWK STREET/ CALIFORNIA AVENUE	WEST OF COFFEE ROAD	WEST OF CALLOWAY DRIVE	WEST OF ALLEN ROAD
Olive Drive	(1,815)	(2,462)	(4,063)	(2,618)	(620)
Hageman Road	(6,289)	(7,501)	(5,408)	(12,261)	(2,109)
Rosedale Highway	23,704	26,384	27,020	34,338	11,399
Westside Parkway and Truxtun Extension	(4,569)	(8,394)	(7,491)	(7,726)	(4,332)
Stockdale Highway	(3,084)	(2,388)	(1,245)	(570)	(286)
Ming Avenue	(524)	(775)	(1,649)	(2,036)	(626)
Other	(7,423)	(4,864)	(7,164)	(9,127)	(3,426)

In addition to the intersection and screenline analysis conducted for State Route 58 West, Rosedale Highway, an analysis was conducted for the shared portion of State Route 99 between State Route 58 West and State Route 58 East.

Figure 3-21, presented earlier, indicated that upgrading Rosedale Highway to a super-arterial east of Allen Road will attract traffic from parallel east–arterials and the Westside Parkway. The graphic also indicated that traffic volumes would increase along State Route 99 as a result of constructing the transportation system management/transit alternative improvements, particularly in the shared section of State Route 99 between State Route 58 West and State Route 58 East.

Insofar as the magnitude of increased traffic along State Route 99, that volume is forecast to be approximately 20,000 vehicles per day over and above the no-build alternative year 2038 average daily traffic.

Table 4-38 lists the peak hour traffic volume comparison for the no-build and transit systems management/transit alternatives, while Table 4-33 lists the level of service computed for the State Route 99 freeway mainline segments between State Route 58 east and the Airport Drive interchange.

Table 4-39 indicates that the level of service will decline by one letter grade in the northbound direction of State Route 99 during one of the two peak periods, resulting in LOS F conditions during both AM and PM peak hours under the transportation systems management/transit alternative. In the southbound direction, congestion will remain at LOS F conditions during the

PM peak period, but will worsen from LOS D to LOS E during the AM peak period in the segment from Rosedale Highway to California Avenue.

As a build alternative, it would be appropriate to address the poor level of service along State Route 99 between State Route 58 west and State Route 58 east, and to mitigate the impacts of attracting higher volumes to State Route 99 as a result of upgrading Rosedale Highway to a super-arterial east of Allen Road. **Auxiliary lanes running in each direction along State Route 99 between State Route 58 west and State Route 58 east would therefore be required to implement the transportation systems management/transit alternative.**

Table 4-38. Transportation Systems Management/Transit Alternative Freeway Segment Forecast Volumes

SEGMENT	DIRECTION	YEAR 2038 NO-BUILD			YEAR 2038 TSM		
		AM PEAK	PM PEAK	ADT	AM PEAK	PM PEAK	ADT
SR 99 from SR 58 to California Avenue	NB	8,655	8,240	108,630	9,546	9,089	119,816
SR 99 from California Avenue to Rosedale Highway	NB	8,280	8,430	112,975	9,025	9,189	123,146
SR 99 from Rosedale Highway to Airport Drive	NB	5,615	6,540	87,295	5,866	6,832	91,191
SR 99 from Airport Drive to Rosedale Highway	SB	5,320	6,710	89,740	5,567	7,022	93,911
SR 99 from Rosedale Highway to California Avenue	SB	7,085	8,620	113,245	7,452	9,066	119,106
SR 99 from California Avenue to SR 58	SB	6,605	8,480	111,845	7,148	9,178	121,048
SR 58 from SR 99 to H Street	EB	4,850	4,585	62,198	5,209	4,925	66,808
SR 58 from H Street to Union Avenue	EB	4,900	4,950	64,258	5,207	5,260	68,286
SR 58 from Union Avenue to H Street	WB	4,595	4,605	65,295	4,959	4,969	70,462
SR 58 from H Street to SR 99	WB	4,265	4,555	60,385	4,664	4,981	66,035

Table 4-39. Transportation Systems Management/Transit Alternative Freeway Segment Analysis

SEGMENT	DIRECTION	YEAR 2038 NO-BUILD				YEAR 2038 TSM			
		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
		LOS	DENSITY	LOS	DENSITY	LOS	DENSITY	LOS	DENSITY
SR 99 from SR 58 to California Avenue	NB	F	—	E	44.0	F	—	F	—
SR 99 from California Avenue to Rosedale Highway	NB	E	44.5	F	—	F	—	F	—
SR 99 from Rosedale Highway to Airport Drive	NB	C	24.5	D	29.1	C	25.6	D	30.9
SR 99 from Airport Drive to Rosedale Highway	SB	C	23.1	D	30.1	C	24.2	D	32.1
SR 99 from Rosedale Highway to California Avenue	SB	D	32.6	F	—	E	35.5	F	—
SR 99 from California Avenue to SR 58	SB	D	29.5	F	—	D	33.1	F	—
SR 58 from SR 99 to H Street	EB	D	28.7	D	26.8	D	31.6	D	29.3
SR 58 from H Street to Union Avenue	EB	D	29.1	D	29.5	D	31.6	D	32.1
SR 58 from Union Avenue to H Street	WB	D	26.9	D	27.0	D	29.5	D	29.6
SR 58 from H Street to SR 99	WB	C	24.8	D	26.6	D	27.4	D	29.7

4.8 Local Roadway Access Modifications

In the case of alternatives A, B, and C, modifications to the local streets and properties are required as part of the project and affect travel access. The adjustments differ in degree depending on the alternative examined. While a number of local streets will be shortened, modified, or removed, little or no disruption to the existing circulation patterns is expected. A number of the street modifications will involve shortening an existing cul-de-sac to accommodate the project right-of-way. In cases where through traffic is eliminated on an existing local roadway, an adjacent or nearby street will provide an alternative route.

Adjustments to local roadways as a result of the proposed project are not expected to impact the provision of transit or emergency services, such as fire or police, or affect access to health care facilities. Some minor adjustments with respect to route maps and patrol duties for fire and police personnel, however, will be necessary to ensure quick response times. Disruptions in access to local schools are expected to be very minimal, with safe and efficient alternatives to currently used routes readily available.

Local roadway modifications and their ramifications for vehicular, bicycle and pedestrian circulation; transit, emergency and health services provision; and the location of schools for each of the build alternatives is detailed below.

Alternative A

Street Closures and General Circulation

Existing roadways requiring access modifications with respect to alternative A are discussed below, and as illustrated in the corresponding graphic representations.

*As presented in **Figure 4-7 (sheets 1 and 6)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 99/State Route 58 interchange.*

NORTH OF STATE ROUTE 58

On the north side of State Route 58 and west of State Route 99, the following existing through streets will be terminated south of Stockdale Highway and north of the proposed right-of-way:

- Jones Street
- Williamson Way

Jones Street will be closed both south of Stockdale Highway and north of Peckham Avenue. Nearby north-south access is available at Stine Road. Williamson Way will be also closed both south of the proposed roadway. Nearby north-south access is available at Real Road.

SOUTH OF STATE ROUTE 58

On the south side of State Route 58 and west of State Route 99, the following existing through streets will be terminated just south of the proposed right-of-way:

- Jones Street
- South Gamsey Avenue
- Williamson Way

South Montclair Street and Stine Road will continue as through streets, forming an underpass at the proposed roadway. Real Road, will form a traffic-divided underpass of the mainline, in addition to the eastbound on-ramps and westbound off-ramps of the proposed highway. South Gamsey Avenue is an existing cul-de-sac that will be shortened to accommodate the roadway right-of-way, with access and circulation not affected.

On the south side of State Route 58 and east of State Route 99, the following existing through streets will be converted to cul-de-sacs just south of the proposed right-of-way, with an existing connecting street eliminated:

- Myrtle Street
- Dixon Avenue

Myrtle Street and Dixon Avenue are currently connected at their northern termini by a connecting street. The street will be eliminated and converted to cul-de-sacs to accommodate the proposed roadway. Both streets will be minimally affected in terms of circulation due to nearby Hughes Lane, which will continue as a major through street.

*As presented in **Figure 4-7 (Sheet 2)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 99, south of the State Route 99/ State Route 58 interchange.*

WEST OF STATE ROUTE 99

On the west side of State Route 99, the following existing streets will be terminated just west of State Route 99:

- Wood Lane
- Laverne Avenue

Eastbound traffic on Wood Lane and Laverne Avenue has access to Belle Terrace or Ming Avenue, streets in close proximity which provide through movements east of State Route 99. Seville Street will be extended north just past Laverne Avenue to serve existing properties. A frontage road connection between Mona Way and Belle Terrace will be established. Belle Terrace will form an underpass of State Route 99. Affects on circulation in this area will be very limited.

EAST OF STATE ROUTE 99

On the east side of State Route 99 and west of State Route 99, no local roadways are effected with the exception of construction at the Belle Terrace overpass.

*As presented in **Figure 4-7 (Sheet 6)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 58 improvement project.*

NORTH OF STATE ROUTE 58

On the north side of State Route 58, the following existing through streets will be terminated just north of the proposed right-of-way:

- McDonald Way
- Business Park South

Existing north–south traffic on McDonald Way will be diverted to Cunan Street to the east and South Montclair Street to the west and result in little circulation impact. Business Park South will be shortened to the north to accommodate the roadway project and traffic will be diverted to adjacent Business Center Drive.

SOUTH OF STATE ROUTE 58

On the south side of State Route 58, the following existing through streets will be terminated just south of the proposed right-of-way:

- Frazier Avenue
- Westwood Street
- McDonald Way

Frazier Avenue and Westwood Street will be terminated; but the connecting street between the two, just south of the proposed roadway, will be retained. McDonald Way will be terminated and traffic diverted east to become Peckham Avenue. North–south traffic will be served by South Montclair Street to the east and Stine Road to the west.

*As presented in **Figure 4-7 (Sheet 7)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 58 improvement project.*

NORTH OF STATE ROUTE 58

Local roadways north of State Route 58 are not affected.

SOUTH OF STATE ROUTE 58

On the south side of State Route 58, the following existing through streets will be converted to cul-de-sacs just south of the proposed right-of-way:

- Brite Street
- South Oleander Avenue
- Houchin Road

Brite Street, an east–west street, will be terminated and the connecting road between Brite Street and South Oleander Avenue eliminated. The existing Houchin Road cul-de-sac will be moved slightly to the south to accommodate the proposed roadway. North–south traffic will still access H Street as currently used.

Transit and Emergency Service Access

Golden Empire Transit bus routes, specifically Routes 9, 11 and 15, are not impacted by alternative A. One health care center and two fire stations are located within the immediate vicinity of the proposed alternative A right-of-way (see Figure 2-7). HealthSouth Bakersfield Rehab is located at 5501 Commerce Drive. Fire stations are located at 3400 Palm Street (City 3) and 7000 Stockdale Highway (City 11). In each case, the expected minimal change in existing local circulation patterns will not unduly affect traffic or the provision of local emergency services as a result of the proposed project. Service provision from the closest police station, Bakersfield Central Receiving Station at 1415 Truxtun Avenue, is not expected to be affected.

Pedestrian and Bicycle Access to Schools

Two schools, Van Horn Elementary at 5501 Kleinpell Street and Henrietta Well Child Guidance Center at 5300 California Avenue, are in the immediate vicinity of the alternative A right-of-way (see Figure 4-21), with at least some students likely forced to access the school via a nearby local alternative to the route currently used. Because the actual closures of streets are minimal and the opportunities for alternate access readily available, situations in which functional access to either facility would be materially affected is not expected.

Alternative B

Street Closures and General Circulation

Existing roadways requiring access modifications with respect to alternative B are discussed below, and as illustrated in corresponding graphic representations.

*As presented in **Figure 4-10 (Sheet 1)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 99/ State Route 58 interchange.*

NORTH OF STATE ROUTE 58

Local roadways on the north side of State Route 58, both east and west of State Route 99, are not affected by the proposed project.

SOUTH OF STATE ROUTE 58

On the south side of State Route 58, and east of State Route 99, the following existing through street will be converted to a cul-de-sac just south of the proposed right-of-way:

- South Myrtle Street

On the south side of State Route 58, and west of State Route 99, the following existing through street will be converted to a cul-de-sac just south of the proposed right-of-way:

- South Gamsey Avenue

Stine Road and Williamson Way, one street on either side from South Gamsey Avenue, will remain as north-south through streets and retain easy access north to Stockdale Highway. Real Road as a major north-south divided collector roadway.

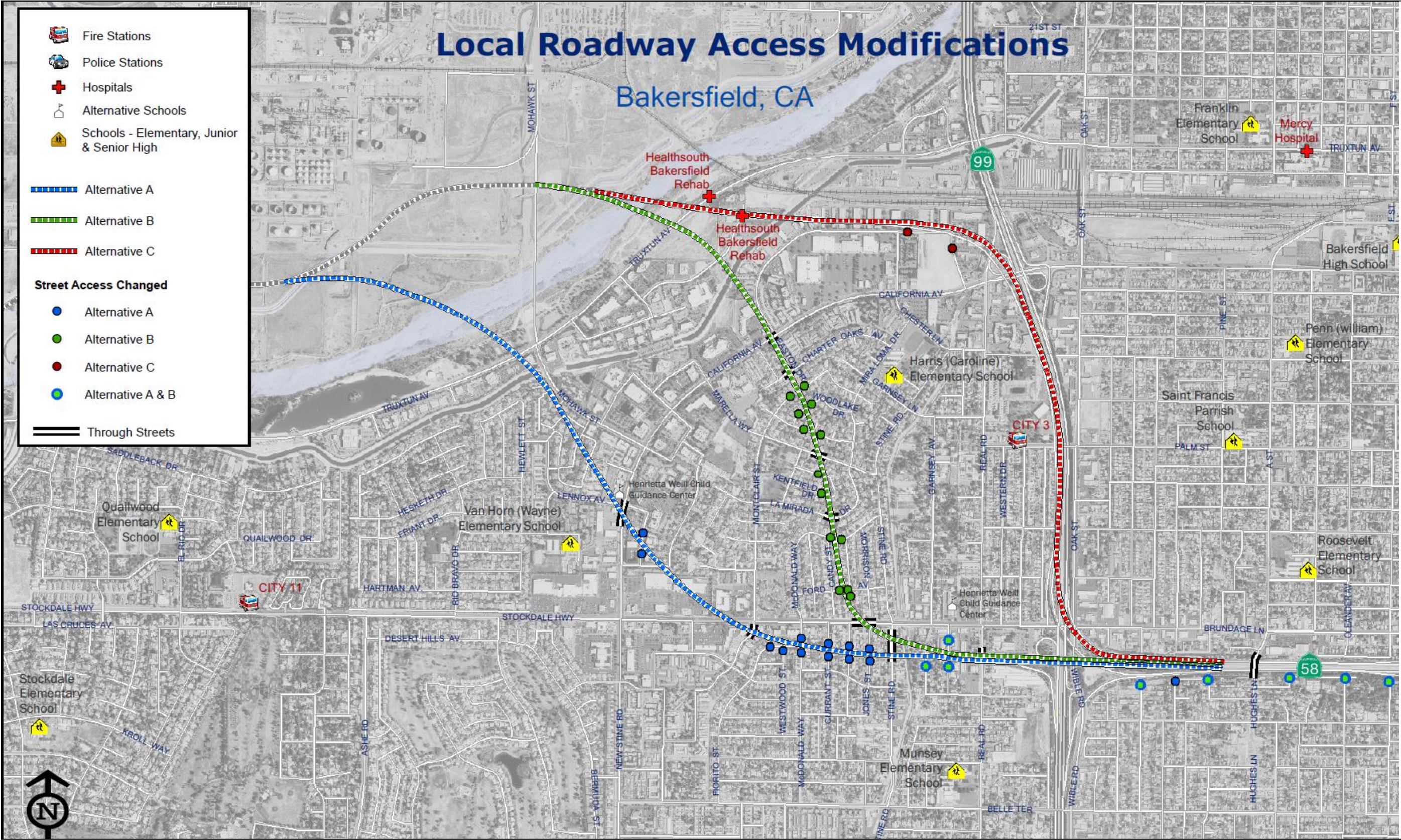


Figure 4-21: Local Roadway Access Modifications

*As presented in **Figure 4-10 (Sheet 2)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 99, south of the State Route 99/ State Route 58 interchange.*

WEST OF STATE ROUTE 99

On the west side of State Route 99, the following existing through streets will be terminated just west of State Route 99:

- Wood Lane
- Laverne Avenue

Seville Street will be extended north just past Laverne Avenue to serve existing properties. A frontage road connection between Mona Way and Belle Terrace will be established. Belle Terrace will form an overpass of State Route 99. The existing Wood Lane cul-de-sac would be moved slightly to the west. North-south through access will remain at Belle Terrace.

EAST OF STATE ROUTE 99

On the east side of State Route 99, and west of State Route 99, no local roadways are affected with the exception of temporary construction activities at the Belle Terrace overpass.

*As presented in **Figure 4-10 (Sheet 6)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 58 improvement project.*

North of State Route 58

On the north side of State Route 58, the following existing through streets will be terminated just north of the proposed right-of-way:

- Kentfield Drive
- Hillsborough Drive

Southbound traffic on Kentfield Drive and Hillsborough Drive would be diverted a short distance east or west to Marella Way or La Mirada Drive, both of which provide through movements via underpasses of the proposed roadway.

SOUTH OF STATE ROUTE 58

On the south side of State Route 58, the following existing through streets will be terminated just south of the proposed right-of-way:

- Kensington Avenue
- Woodlake Drive
- Montclair Street
- Charter Oaks Avenue

Northbound traffic on Kensington Avenue, Woodlake Drive, Montclair Street, and Charter Oaks Avenue will be diverted either east or west to California Avenue or either Marella Way or La

Mirada Drive, respectively. California Avenue remains as a major north–south divided arterial roadway.

*As presented in **Figure 4-10 (Sheet 7)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 58 improvement project.*

NORTH OF STATE ROUTE 58

Local roadways north of State Route 58 are not affected.

SOUTH OF STATE ROUTE 58

On the south side of State Route 58, the following existing streets will be converted to cul-de-sacs just south of the proposed right-of-way:

- Dixon Avenue
- Brite Street
- South Oleander Avenue
- Houchin Road

Brite Street, an east–west street, will be terminated and the connecting road between Brite Street and South Oleander Avenue eliminated. Northbound traffic on Dixon Avenue will be directed one block east to Hughes Lane. Northbound traffic on South Oleander Avenue, and Houchin Road will be diverted to H Street, one and two blocks to the east, respectively. Hughes Lane, H Street, Chester Avenue, and South P Street will remain as north–south arterial roadways.

Transit and Emergency Service Access

Golden Empire Transit bus routes, specifically Routes 9 and 15, are not impacted by alternative B. One health care center and one fire station are located within the immediate vicinity of the proposed alternative A right-of-way (see Figure 2-7). HealthSouth Bakersfield Rehab is located at 5501 Commerce Drive. A fire station is located at 3400 Palm Street (City 3). In each case, the expected change in existing local circulation patterns will not unduly affect traffic or the provision of local emergency services as a result of the proposed project. Service provision from the closest police station, Bakersfield Central Receiving Station at 1415 Truxtun Avenue, is not expected to be affected.

Pedestrian and Bicycle Access to Schools

Two schools, Harris Elementary at 4110 Garnsey Lane north of Stockdale Highway and Stockdale Christian School located at the corner of Marella Way and California Avenue, are in the immediate vicinity of the alternative B right-of-way (see Figure 4-21). It is expected that some students will be required to access the school from the south for residents between Stine Road and Williamson Way, south of the proposed roadway. However, because the actual closures of streets are minimal and the opportunities for alternate access are readily available, situations in which functional access to either facility would be materially affected are not expected. A Class 3 bicycle route along Montclair Street north of Marella Way will be realigned to Mira Loma Drive to continue the provision of bike route access to the two schools.

Alternative C

Street Closures and General Circulation

Existing roadways requiring access modifications with respect to alternative C are discussed below, and as illustrated in corresponding graphic representations.

*As presented in **Figure 4-13 (Sheet 2)**, the following roadways and adjacent property will be affected in the vicinity of the State Route 99/ State Route 58 interchange.*

WEST OF STATE ROUTE 99

On the west side of State Route 99, the following existing street will be terminated just west of State Route 99:

- Chester Lane

Chester Lane currently forms a cul-de-sac at its eastern most terminus, just west of State Route 99. Traffic circulation will not be affected as the two streets on either side of Chester Lane, California Avenue and Palm Street, provide east–west through access.

EAST OF STATE ROUTE 99

Local roadways east of State Route 99 are not affected.

*As presented in **Figure 4-13 (Sheet 3)**, the following roadways and adjacent property will be affected in the vicinity of State Route 99 north and south of Stockdale Highway.*

WEST OF STATE ROUTE 99

On the west side of State Route 99, the following existing streets will be terminated or modified just west of the proposed right-of-way:

- Elcia Drive
- Terrace Way
- Wood Lane

Elicia Drive and Terrace Way, two adjacent and parallel streets will be connected just west of State Route 99 to provide circulation for adjacent properties. A frontage road connection between Mona Way and Belle Terrace will be established. Belle Terrace will form an overpass of State Route 99. The existing cul-de-sac on Wood Lane would be moved slightly to the west. North–south through access will remain at Belle Terrace.

EAST OF STATE ROUTE 99

Local roadways east of State Route 99 are not affected.

*As presented in **Figure 4-13 (Sheet 8)**, the following roadway and adjacent property will be affected in the vicinity of the junction between State Route 99 and the proposed roadway.*

NORTH OF STATE ROUTE 58

Local roadways north of State Route 58 are not affected.

SOUTH OF STATE ROUTE 58

On the south side of State Route 58, an existing street will be converted to a cul-de-sac just south of the proposed right-of-way:

- Commerce Drive

Commerce Drive currently ends in a cul-de-sac south of Truxtun Avenue. Commerce Drive will be terminated farther to the south in order to accommodate the proposed roadway right-of-way, but neither circulation, nor access, is affected.

Transit and Emergency Service Access

Golden Empire Transit bus routes, specifically Routes 8 and 15, are not impacted by alternative C. One health care center and one fire station are located within the immediate vicinity of the proposed alternative C right-of-way (see Figure 2-7). HealthSouth Bakersfield Rehab is located at 5501 Commerce Drive. A fire station is located at 3400 Palm Street (City 3). In each case, the expected minimal change in existing local circulation patterns will not unduly affect traffic or the provision of local emergency services as a result of the proposed project. Service provision from the closest police station, Bakersfield Central Receiving Station at 1415 Truxtun Avenue, is not expected to be affected.

Pedestrian and Bicycle Access to Schools

Based on the location of schools in the vicinity of alternative C construction, no changes in access for students are expected as a result of the project (see Figure 4-20).

4.9 Freeway Access Modifications

Modifications to existing access ramps along State Route 99 and State Route 58 are required as part of the project and will impact travel access. Impacts will differ in degree depending on the alternative and location examined.

Freeway access modifications resulting from the proposed project are not expected to impact the provision of emergency services, such as fire or police, or affect access to health care facilities. Minor re-routing adjustments with respect to call response and patrol duties for fire and police personnel will be necessary to ensure quick response times. Disruptions in access to local schools are expected to be very minimal, with safe and efficient alternatives to currently used routes readily available.

Freeway access modifications and their ramifications for local circulation and alternative travel route recommendations are itemized below:

- The southbound State Route 99 off-ramp with direct access to Stockdale Highway will be eliminated under **alternatives A, B and C**. The provided alternative will be for vehicles to exit instead at the California Avenue interchange, just to the north. California Avenue and Oak Street provide a direct connection with the Stockdale Highway corridor.

- The northbound State Route 99 exit and entrance access points to and from Wible Road will be eliminated under **alternatives A, B and C**. Under existing and no-build conditions, these ramps provide access to and from the Stockdale Highway corridor. The provided alternative will be for vehicles to utilize either the California Avenue interchange to the north or the Ming Avenue interchange to the south, depending upon their destination.
- Access from Real Road and the Stockdale Highway corridor to southbound State Route 99 will be eliminated under **alternatives A, B and C**. The available alternative will be for drivers to utilize Real Road or Stine Road to access southbound State Route 99 via the Ming Avenue interchange.
- The connection between westbound State Route 58 to Real Road and the Stockdale Highway corridor will be eliminated under **alternatives A and B**, only. The likely alternative is for drivers to utilize the H Street/Chester Avenue interchange. The next nearest intersection to the north would be Calloway Drive in the case of alternative A and Mohawk Street in the case of alternative B.
- Ming Avenue corridor access to and from State Route 58, east of State Route 99, will be eliminated under **alternatives A and B**, only. The area is characterized by relatively heavy traffic associated with movements to and from the Valley Plaza Mall and other nearby retail businesses. The provided alternative will be for vehicles to utilize the H Street/Chester Avenue interchange.
- Access from westbound State Route 58 to California Avenue via State Route 99 will be eliminated under **alternative C**, only. Drivers will instead be required to utilize the H Street/Chester Avenue interchange to access California Avenue to the north.

4.10 Add-on Elements

The description of the transportation network in Section 3.3 identifies a large number of highway and transit elements listed in the *2011 Regional Transportation Plan (Amendment 1)* and/or the *Metropolitan Bakersfield Impact Fee—Proposed Phase IV Improvement* list of projects. These elements serve as background to the build alternatives as well as the no-build alternative.

The description of the transportation systems management/transit alternative (alternative M) indicates that a number of low cost improvements were assumed for the no-build alternative, and were therefore not specifically studied as a new component of the transportation system for alternative M. These low cost improvements include traffic signal optimization, intersection widening, and bus turnouts to reduce delay and increase the capacity along the following corridors:

- Hageman Road from Calloway Drive to State Route 99
- Rosedale Highway from Enos Lane (State Route 43) to State Route 99
- Truxtun Avenue from the Westside Parkway to Oak Street
- Stockdale Highway from Old River Road to Oak Street/Wible Road

- Ming Avenue from Old River Road to State Route 99
- Coffee Road from Stockdale Highway to Westside Parkway
- California Avenue from Stockdale Highway to Mohawk Street
- Mohawk Street from California Avenue to the Westside Parkway

Additional elements of the transportation systems management/transit alternative would include deploying intelligent transportation systems strategies to improve mobility and reduce fuel consumption and green house gas emissions.

This alternative would also include increasing transit service along Rosedale Highway and Stockdale Highway to reduce the overall vehicular demand in these east–west corridors and other potential travel demand management techniques. The transit improvements would primarily focus on an increase in frequency of service that would result in reduced automobile demand. Finally, area-wide transportation demand management strategies would be considered to reduce travel demand through establishing parking fees, encouraging carpool formation, and encouraging flextime for employees. These improvements to transit service and implementation of travel demand management techniques are also assumed for the no-build alternative, and are therefore not specifically studied as a new component for alternative M or the remaining build alternatives.

In and of themselves, these add-on elements do not fully address the purpose of the Centennial Corridor project, that being to provide continuity and associated traffic congestion relief for State Route 58 in Kern County. Also, the add-on elements do not:

- Provide interregional and regional connectivity for east–west traffic traveling within metropolitan Bakersfield and Kern County,
- Promote economic growth and international/interregional trade by improving linkages between existing segments of the interstate system, or
- Reduce commercial and regional commute time through a major freight corridor.

The add-on elements do, however, contribute to the following two objectives:

- Improve local east–west circulation and reduce congestion to accommodate existing and planned land uses in accordance with adopted growth projections.
- Improve operations and reduce congestion on the shared portion of State Route 58 and State Route 99

By virtue of this contribution, a number of add-on elements are worthy of consideration for all of the build alternatives, independent from the Centennial Corridor project.

Discussed below are potential capital investment projects that could materially contribute to improving local east–west circulation and traffic operations along the shared portion of State Route 58 and State Route 99. Not discussed are public policy initiatives which are outside the purview of this investigation.

Example Public Policy Transportation Demand Strategies that Are Beyond the Scope of the Centennial Corridor Project

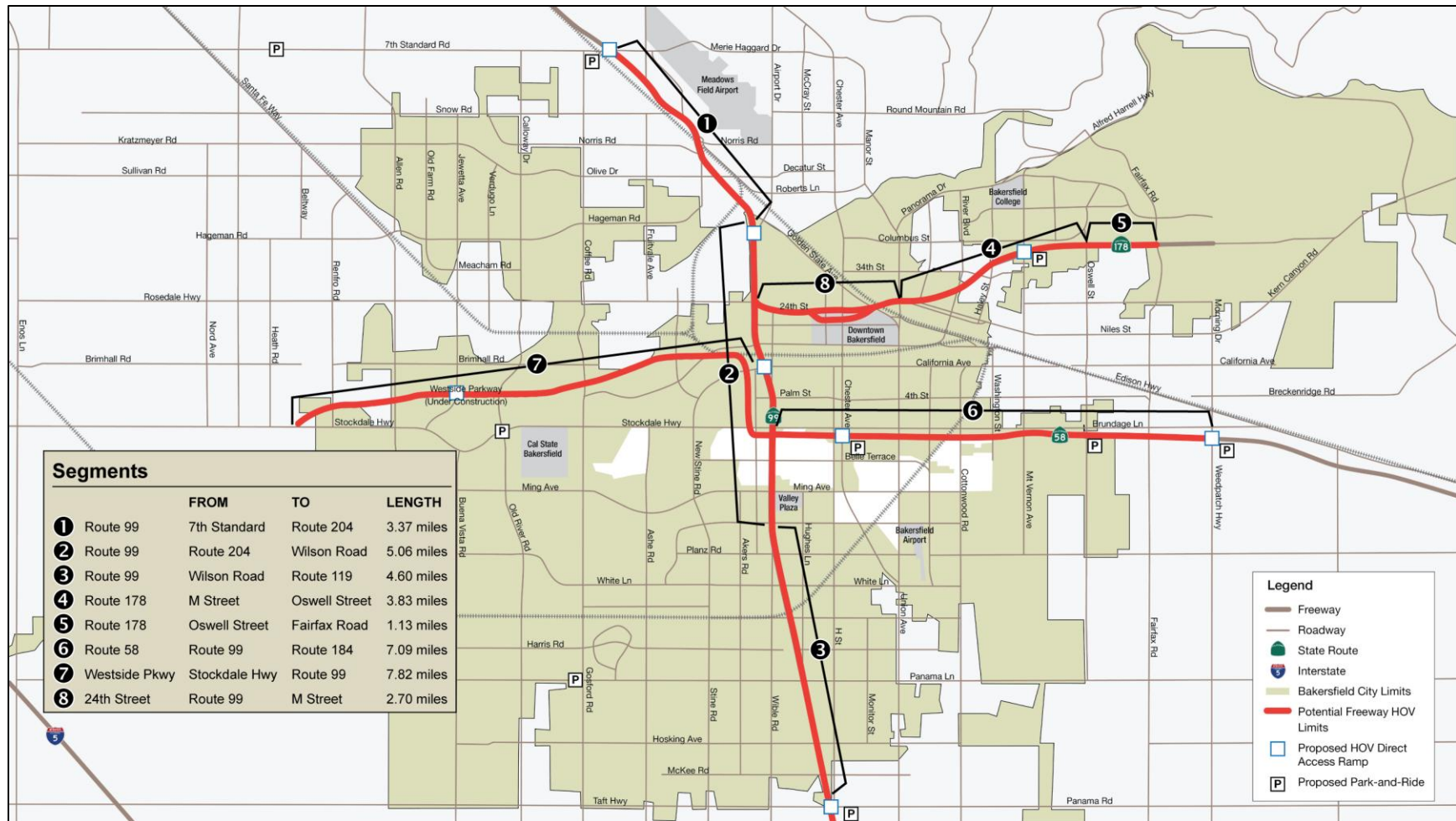
- Alternative work schedules
- Carsharing
- Flextime
- Guaranteed ride home
- Public bike systems
- Ridesharing
- Taxi service improvements
- Telecommuting
- Traffic calming
- Commuter financial incentives
- Congestion pricing
- Increasing fuel taxes
- Parking pricing
- Vehicle use restrictions
- Land use management
 - New urbanism
 - Smart growth
 - Transit oriented development
- Transportation demand management marketing
- Transportation management associations

Managed/High Occupancy Vehicle Lanes

Managed lanes are the operational designation of one or more lanes of traffic to limit use to designated vehicle user groups. These user groups can be those with high-occupancy (two or more persons per vehicle), express lanes which limit ingress and egress to longer distance trips, and/or HOT (high-occupancy toll) lanes which permit single occupant vehicles to utilize the high-occupancy lane by paying a toll. These terms are often used interchangeably.

In 2005, Caltrans prepared the “High Occupancy Vehicle Lane Viability Study for the San Joaquin Valley” to identify potential locations where HOV (high occupancy vehicle) lanes might be applicable in the San Joaquin Valley. It indicated that there were several state highway corridors, including State Route 99 and State Route 58, where HOV lanes might be considered. As a follow-up to this study and the Route 99 Business Plan, Kern COG is currently conducting a more detailed study to determine if and where HOV lanes and ramp metering systems might be appropriate within Kern County. The *Kern High Occupancy Vehicle/Bus Rapid Transit Study* (HOV/BRT Study) is investigating the feasibility of adding HOV lanes to routes 58, 99 and 178 as illustrated on Figure 4-22. Findings and recommendations are not available as of March 2012, but early indications suggest that HOV lanes will not be warranted within metropolitan Bakersfield until after 2040.

Reflecting this future potential, the Centennial Corridor project definition of State Route 58/ Westside Parkway, from Cottonwood Road to the Stockdale Highway tie-in, includes a median of sufficient width to accommodate the addition of an HOV/HOT/express managed lane per direction at a later date. While no plan currently exists for such a facility, build alternatives A, B, and C, plus the Westside Parkway will all accommodate the addition of managed lanes should they be warranted.



Source: IBI Group for the Kern Council of Governments, HOV/BRT Study – Alternatives Evaluation, March 14, 2012

Figure 4-22: Potential HOV Lanes

Park and Ride Lots

Caltrans managed lanes are comprised of HOV lanes, express lanes and park-and-ride facilities. The location of park-and-ride facilities located within Kern County and Caltrans District 6 are illustrated on Figure 4-23 and are listed below.

- Lot ID #4 is located along State Route 99 on the south side of Stockdale Highway between Real Road and State Route 99. The facility is owned by the state and provides 49 spaces.
- Lots ID #5 and #6 are located along State Route 58 in the northwest and southeast quadrants of the interchange with State Route 184 (Weedpatch Highway). The two lots lie within the state right-of-way and collectively provide 36 spaces.
- Lot ID #7 is located along Route 99 at the Delano Airport. The facility is part of the airport parking lot and is owned by the city. Twenty-five spaces are available for use.
- Lot ID #8 is located along State Route 119 at Ford City, near Taft. The facility is located within state right-of-way and provides 22 spaces.
- Lot ID #9 is located along State Route 155, near its junction with State Route 178 at Lake Isabella. Eleven spaces are available at this location.

In addition to these **formal** park-and-ride lots, numerous **informal** locations are used by carpoolers throughout the county. No inventory of these informal lot locations is available.

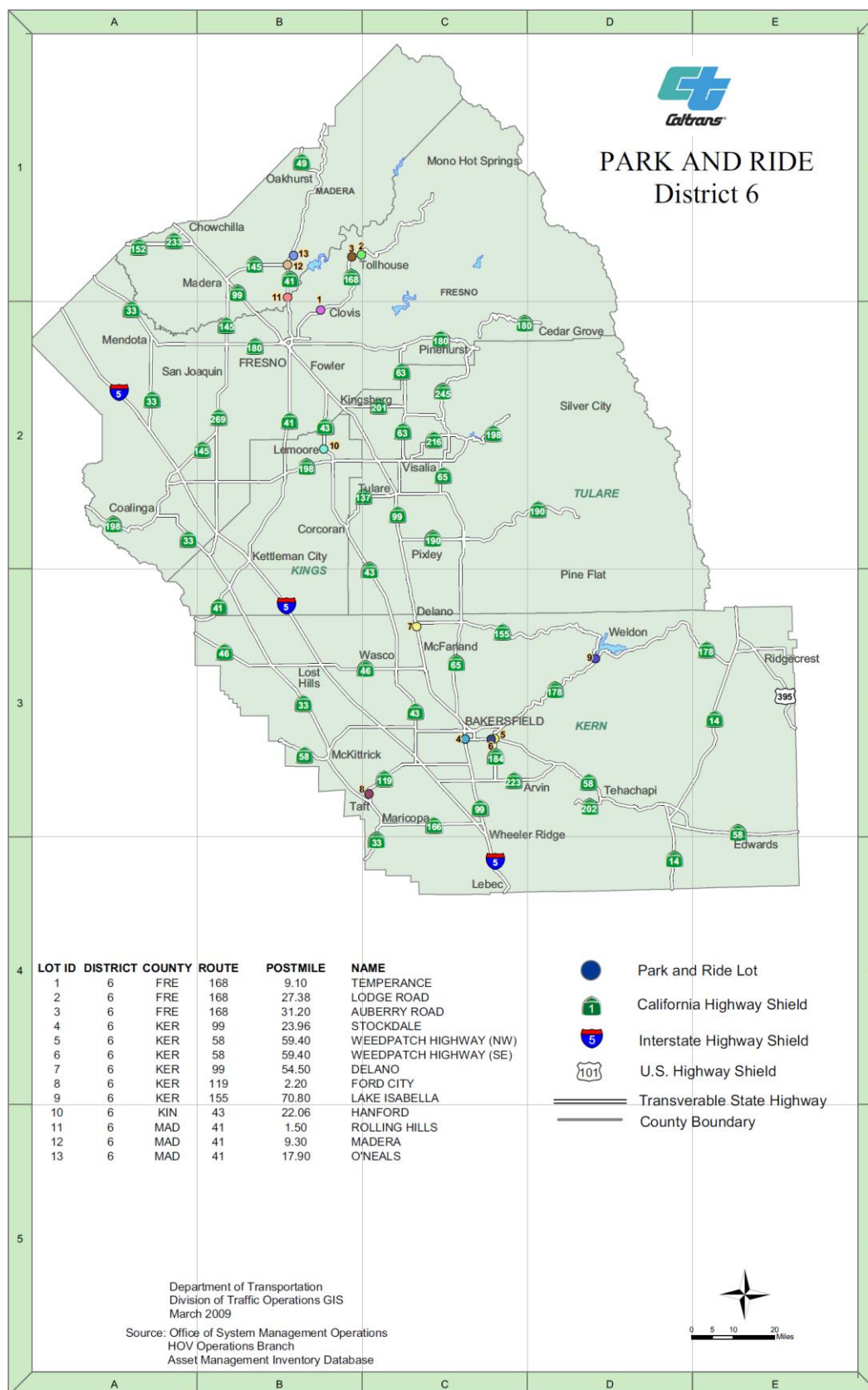
As part of the Centennial Corridor project, Lot ID #4 will be relocated from Stockdale Highway to Mohawk Street near California Avenue (alternative A), California Avenue near Easton Drive (alternative B), or Real Road near California Avenue (alternative C). Additional park-and-ride facilities may be constructed as part of future managed lane projects, as part of implementing the Kern COG HOV/BRT study findings (see Figure 4-22 for potential locations), or as part of the implementation of the Metropolitan Bakersfield Transit System Long-Range Plan.

Long-Range Transit System Enhancements

The definition of the no-build, transportation systems management/transit alternative, and build alternatives A, B and C, all assume the enhancement of Golden Empire Transit fixed route services as identified in the *2011 Final Regional Transportation Plan* (June 15, 2010) constrained program of projects. This list of projects includes the purchase of 120 full size buses and replacements for those buses over the 2011 to 2035 plan horizon. The 120 bus purchase will provide for replacement of the existing fleet and expansion of service (coverage and frequency of service) as defined by the *Metropolitan Bakersfield Major Transportation Investment Strategy*¹, adopted by the City of Bakersfield, County of Kern, Kern COG, Golden Empire Transit District, California Department of Transportation and the San Joaquin Valley Unified Air Pollution Control District.

The 120-bus fleet will allow for a deployment of 100 buses during peak hours and the mid-day, with 20 buses reserved for spares. This level of bus utilization represents roughly a doubling of service compared with existing service.

¹ Final Strategy Report, December 29, 1997, Barton-Aschman Associates, Inc.



To provide further definition to this long-range transit strategy, the Golden Empire Transit district and Kern COG have recently prepared the *Metropolitan Bakersfield Transit System Long-Range Plan*². The plan defines a route restructuring proposal as illustrated on Figure 4-23, an increase in service frequencies, the deployment of 95 buses throughout peak and mid-day periods, plus potentials for bus rapid transit, commuter rail, and supporting park-and-ride lots.

The bus rapid transit, commuter rail services, and potential conversion of bus rapid transit to light rail transit are identified in both the *2011 Final Regional Transportation Plan* and the *Metropolitan Bakersfield Transit System Long-Range Plan* as being unfunded. Hence, they cannot be included in the definition of the Centennial Corridor project, but they may be added at a later date when or if funding is available.

The construction of park-and-ride lots having some 750 spaces is identified in the constrained list of *2011 Final Regional Transportation Plan* projects. The specific location of these lots is yet to be determined; however, Figures 4-22 and 4-24 illustrate a number of potential locations.

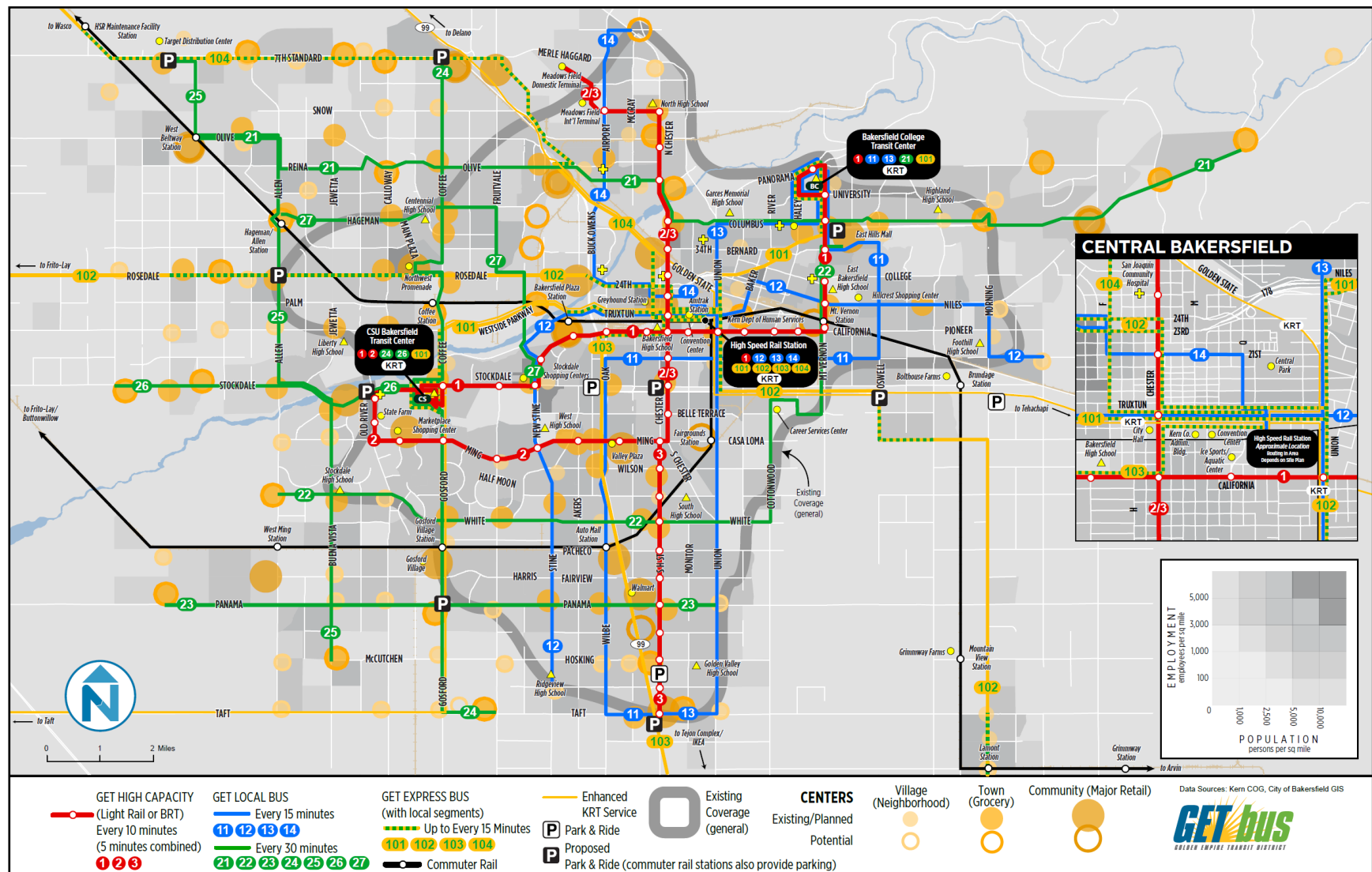
Ridership forecasts prepared for the long-range transit plan indicate that the number of bus riders would roughly double by year 2035 from current levels, to approximately 35,000 linked transit trips per day. Seven to eight percent of these trips (2,450 to 2,800) would occur during the 7:00 to 8:00 a.m. and 4:00 to 5:00 p.m. peak hours, while up to 3,300 trips would occur during the transit system peak hour from 3:00 to 4:00 p.m. (based on existing rider diurnal use). This rider use would be distributed throughout the system, with Routes 2, 12, and 21 attracting the highest volume of users (see Figure 4-24).

Intelligent Transportation Systems Strategies

Kern COG, Caltrans District 6, Caltrans New Technology and Research Program, as well as various cities and transportation agencies within the Kern County region are working to identify intelligent transportation systems application opportunities within the county. To date, six programs have been developed to integrate and expand intelligent transportation systems in the region:

- Communication Network Development Program—Connects different agencies within the region to allow coordination in operating and managing the transportation system. Examples include building communication links with Bakersfield SONET ring and developing smart call boxes.
- Traffic and Incident Management Program—Integrates various state, regional, and local agencies serving Kern County into a comprehensive, region-wide approach to traffic and incident management. Examples include census stations, system and/or incident detectors, coordinated incident management procedures, and freeway changeable message signs.
- Kern Traveler Safety Program—Combines applications that address safety, such as weather stations, smart studs, and rock-fall detection systems.

² Draft Final Report, November 2011, Nelson\Nygaard Consulting Associates



Source: Nelson\Nygaard Associates for Golden Empire Transit District/Kern Council of Governments, *Metropolitan Bakersfield Transit System Long-Range Plan, Draft Final Report*, November 2011

Figure 4-24: Proposed Golden Empire Transit, Enhanced Kern Regional Transit and Commuter Rail Fixed Route Service (Long-Term)

- Kern Informed Traveler Program—Uses advanced warning systems for the reduction of accidents and congestion. Examples include advanced traveler information system development, Bakersfield's transportation operations center upgrades, and interactive commuter kiosks.
- Kern Smart Transit Program—Increases transit's share of the commuting market by providing an alternative mode that is flexible, convenient, and responsive to customer demand. Examples include upgrading Golden Empire Transit service and coordinating Golden Empire Transit and Kern Regional Transit schedules.
- Enhanced Emergency Response Program—Provides police, sheriff, fire ambulance, and other service providers with tools that determine quickly and accurately which routes will be most beneficial. Examples include workstations for emergency response providers and establishing emergency corridor routes.

Insofar as the Centennial Corridor project, the Traffic and Incident Management Program is the most applicable potential add-on element for the no-build, transportation systems management/transit alternative, and build alternatives A, B, and C.

Intelligent transportation systems elements pertaining to State Route 58 and State Route 99 freeway segments include:

- Closed circuit television to improve traffic surveillance
Closed circuit television is used primarily to monitor traffic conditions, to respond quickly to incidents, and to provide information to motorists.
- Vehicle detection system to improve traffic surveillance
Vehicle detection system loops are added/replaced on mainline freeway lanes to allow Caltrans to monitor traffic volume, speed and congestion.
- Ramp metering to improve traffic management
Ramp metering can be added to existing as well as new interchange ramps to regulate the flow of vehicles from the arterial streets on to the freeway system, to optimize flow and minimize turbulence caused by heavy traffic attempting to enter the right-hand lanes of the freeway.
- Changeable message signs to improve motorist information
These signs allow Caltrans to post travel times, incident alerts, construction/detour information and other real-time information to assist motorists in making route choice decisions.
- Adaptive traffic signal control to improve traffic management
Links Caltrans traffic management center with city traffic management centers. Provides the capability to adapt traffic signal timing system-wide to respond dynamically to highly variable travel conditions.

Implementation of these potential ITS elements will require add-on investments in backbone communication links and systems such as fiber optics networks, custom software development and interagency agreements. Caltrans considers these types of intelligent transportation systems deployments to be **high risk**. As such, the specific definition of appropriate intelligent

transportation systems add-on elements for the freeway system serving metropolitan Bakersfield is beyond the purview of this investigation. Nevertheless, the installation of ramp metering equipment is being included in the design plans for build alternatives A, B and C. The addition of ramp meters to existing interchanges beyond the limits of the Centennial Corridor project should be considered as additional add-on investments.

Taken collectively, the add-on elements outlined above do not address the purpose of the Centennial Corridor project. As such, they do not represent a viable project alternative. The add-on elements, individually or collectively, can however, contribute to accommodating local east–west circulation and reducing congestion on the shared portion of State Route 58 and State Route 99. By virtue of this potential contribution, they are worthy of consideration for inclusion within the constrained (funded) list of projects of future regional transportation plans prepared for Kern County.

4.11 Future Projects and Interim Conditions

The description of the transportation network in Section 3.3 identifies a large number of highway and transit elements listed in the 2011 Regional Transportation Plan (Amendment 1) which are “constrained” by funding that is currently available or reasonably projected to be available by the opening (2018) and design year (2038) analysis scenarios. In addition to these constrained projects, two “unconstrained” (unfunded) projects have been considered by this traffic study:

1. The construction of segment 3 of the Centennial Corridor from the west end of the Westside Parkway to Interstate 5
2. The construction of segment 1 freeway-to-freeway connector ramps between State Route 58 (west) and State Route 99 north.

These future projects and interim conditions are discussed below.

Segment 3—Heath Road to Interstate 5

The limits of segment 3 are illustrated on Figure 4-25. The ultimate alignment is proposed as a new 7.4-mile-long freeway that would follow an east–west alignment parallel to the Cross Valley Canal. The route would be about one-third mile south of Stockdale Highway from Heath Road to about 1.2 miles west of State Route 43. The alignment would continue to follow the canal in a southwest direction and connect to Interstate 5 at a new freeway-to-freeway interchange located two miles south of the Stockdale Highway/Interstate 5 interchange. Segment 3 was evaluated in the approved *Route 58 Route Adoption Project, A Tier I Environmental Impact Statement/Environmental Impact Report* (Caltrans, 2001). A Tier I document shows a general alignment and identifies impacts at a conceptual level and is done when there is not full funding for the improvements. An alignment known as the Cross Valley Canal alignment was identified as the “least environmentally damaging practicable alternative.” Segment 3 will remain at the Tier I, route-adoption level of analysis until there is sufficient funding for construction. At that time, a project-level environmental document will be prepared.

In the interim, Stockdale Highway, from the Westside Parkway to Interstate 5, would be temporarily adopted as State Route 58, under build alternatives A, B and C. Under the no-build

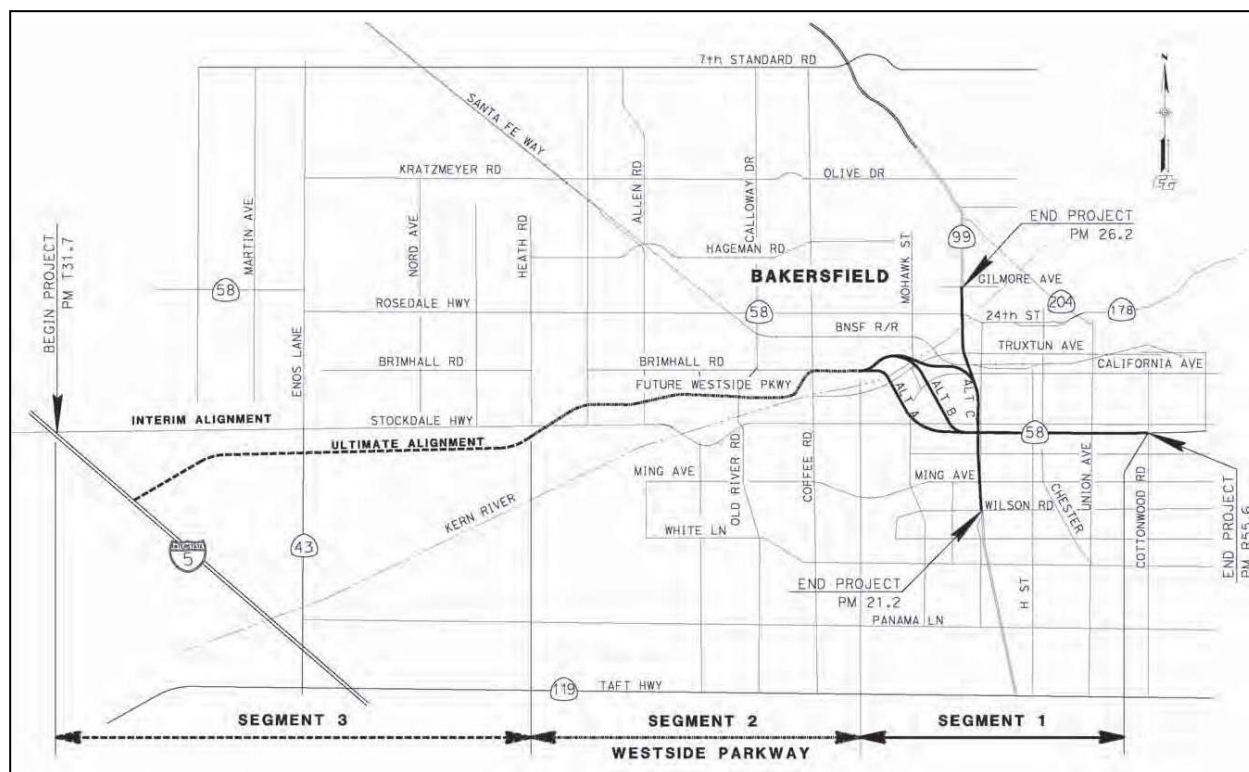


Figure 4-25: Project Location Map

and transportation system management alternatives, State Route 58 would remain on its currently alignment. With build alternatives A, B, and C, improvements would be required at the Stockdale Highway and State Route 43 (Enos Lane) intersection. The proposed improvements would widen the intersection along all approaches and add signals to control the traffic movements. Enos Lane would be widened to add a dedicated left-turn lane and a shared through/right-turn lane in both directions. Stockdale Highway would be widened to provide a dedicated left-turn lane, a dedicated through movement lane, and a shared through/right-turn lane in both directions. Though physically located in Segment 3, these improvements would be built as part of segment 1 to ensure adequate traffic operations at this intersection.

In addition to these project related improvements at Stockdale Highway and Enos Lane, land developer improvements are assumed under no-build and build alternatives A, B, and C as a condition of entitlement. These land development conditions of approval call for the widening of Stockdale Highway to four lanes from Nord Road to Enos Lane and the installation of traffic signals and intersection improvements at Stockdale Highway and Wegis Avenue and at Stockdale Highway and Nord Road. These intersection improvements and lane additions are assumed under all year 2038 no-build and build analysis scenarios.

In addition to local street intersections, the traffic analysis examined traffic operations at the two off-ramp termini intersections of Stockdale Highway and Interstate 5. The analysis results (reported earlier in Tables 4-14, 4-21, 4-28 and 4-35) indicated that by year 2038, a traffic signal would need to be installed at the Interstate 5 southbound off-ramp to Stockdale Highway. This traffic signal installation is needed for all no-build and build project scenarios for year 2038 projected traffic volumes. A signalized intersection is not needed to address opening year 2018 conditions.

The Federal Highway Administration's August 2010 *Interstate System Access Informational Guide* indicates that improvements to traffic control at ramp termini with local roads should be reviewed to ensure that the changes in traffic control (i.e., signalization) do not result in queue spillback into the mainline lanes of the interstate facility and that sufficient storage is provided. Table 4-40 addresses this analysis guideline. Information is presented for the intersections mentioned in this section that may be signalized in the future, as part of this project or by others.

It should be noted that construction of a new freeway segment from Heath Road to Interstate 5 will likely negate the need for a traffic signal installation at the southbound off-ramp to Stockdale Highway. As this traffic signal is not needed for opening year project conditions, and may never be needed under future conditions, this traffic operational analysis recommends that coordination with FHWA's Division Office be deferred until such time that traffic volumes and queue lengths approach or meet traffic signal warrants.

With the installation of traffic signals at the intersections identified above, Stockdale Highway will operate at level of service C or better conditions at all segment 3 study intersections. These LOS analysis results were reported in Tables 4-14, 4-21, 4-28, and 4-35 as noted previously. The traffic volumes and intersection lane configurations assumed for the analysis are depicted on Figures 3-8, 3-13, 3-18, and 3-23 for year 2038 peak hour conditions.

In addition to intersection analysis, highway segment analysis was conducted for the two segments lying east and west of State Route 43 which are unsignalized (uninterrupted flow) for a distance of two or more miles:

1. Interstate 5 to State Route 43
2. State Route 43 to Nord Road

As prescribed in Chapters 12 and 20 of the *2000 Highway Capacity Manual*, the LOS for two-lane, two-way rural highway segments is determined based on the following two measures of effectiveness:

1. Percent time spent following. For two-lane highways, percent time spent following is a measure of the driver's freedom to maneuver and to freely select the speed at which they wish to travel on the highway segment. Percent time spent following also serves as an indicator of the comfort and convenience of travel on the highway segment.
2. Average travel speed. Average travel speed is a measure of the mobility of the highway segment.

The two-lane, two-way highway level of service methodology categorizes highways into two functional categories for analysis:

1. Class I highways are those on which motorists expect to travel at relatively high speeds. Class I highways are primary routes that often serve long trips or serve as connecting links between facilities that serve long trips. Typically, highways that are part of major commute routes would be Class I facilities.
2. Class II highways are those on which motorists do not necessarily expect to travel at high speeds. Class II highways are not major arterials and often serve as scenic or recreational highways.

Table 4-40. Stockdale Highway Intersection Approach Queue Lengths (feet) (Year 2038)

INTERSECTION	ALTERN/ATIV E	TIME	NORTHBOUND		SOUTHBOUND		EASTBOUND		WESTBOUND	
			LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
I-5 southbound ramp	Design	N/A	N/A	N/A	1000	1000	N/A	N/A	N/A	N/A
	No-build	AM	N/A	N/A	120	120	N/A	N/A	N/A	N/A
		PM	N/A	N/A	>1000	>1000	N/A	N/A	N/A	N/A
	A	AM	N/A	N/A	120	120	N/A	N/A	N/A	N/A
		PM	N/A	N/A	178	178	N/A	N/A	N/A	N/A
	B	AM	N/A	N/A	110	110	N/A	N/A	N/A	N/A
		PM	N/A	N/A	200	200	N/A	N/A	N/A	N/A
	C	AM	N/A	N/A	116	116	N/A	N/A	N/A	N/A
		PM	N/A	N/A	170	170	N/A	N/A	N/A	N/A
I-5 northbound ramp	Design	N/A	1000	1000	N/A	N/A	N/A	N/A	N/A	N/A
	No-build	AM	50	50	N/A	N/A	N/A	N/A	N/A	N/A
		PM	68	68	N/A	N/A	N/A	N/A	N/A	N/A
	A	AM	50	50	N/A	N/A	N/A	N/A	N/A	N/A
		PM	56	56	N/A	N/A	N/A	N/A	N/A	N/A
	B	AM	50	50	N/A	N/A	N/A	N/A	N/A	N/A
		PM	54	54	N/A	N/A	N/A	N/A	N/A	N/A
	C	AM	50	50	N/A	N/A	N/A	N/A	N/A	N/A
		PM	54	54	N/A	N/A	N/A	N/A	N/A	N/A
Enos Lane	Design	N/A	N/A	N/A	N/A	N/A	100	N/A	100	100
	No-build	AM	N/A	N/A	N/A	N/A	46	N/A	100	52
		PM	N/A	N/A	N/A	N/A	62	N/A	90	52
	A	AM	N/A	N/A	N/A	N/A	44	N/A	100	46
		PM	N/A	N/A	N/A	N/A	70	N/A	82	42
	B	AM	N/A	N/A	N/A	N/A	44	N/A	98	56
		PM	N/A	N/A	N/A	N/A	64	N/A	88	50
	C	AM	N/A	N/A	N/A	N/A	48	N/A	100	56
		PM	N/A	N/A	N/A	N/A	68	N/A	80	58
Nord Road	Design	N/A	150	N/A	150	N/A	150	100	325	225
	No-build	AM	72	N/A	94	N/A	32	16	144	44
		PM	76	N/A	80	N/A	50	22	239	36
	A	AM	58	N/A	96	N/A	32	16	146	52
		PM	80	N/A	70	N/A	64	24	264	26
	B	AM	66	N/A	88	N/A	32	20	137	48
		PM	70	N/A	80	N/A	74	26	254	40
	C	AM	70	N/A	82	N/A	26	12	145	44
		PM	42	N/A	74	N/A	0	26	263	38
Wegis Avenue	Design	N/A	100	300	200	N/A	200	150	200	150
	No-build	AM	38	100	164	N/A	32	22	144	38
		PM	38	98	128	N/A	52	22	92	44
	A	AM	36	138	158	N/A	38	22	184	34
		PM	54	156	140	N/A	48	18	194	48
	B	AM	44	142	148	N/A	30	22	182	28
		PM	58	160	138	N/A	42	10	196	42
	C	AM	40	106	162	N/A	38	22	118	48
		PM	32	122	128	N/A	38	20	82	54

Notes:

1. Design equals available or proposed storage length.
2. No-build and build alternative queue lengths computed for 95th percentile (the queue length at or below which occurs 95 percent of the time).
3. Southbound I-5 and Stockdale Highway intersection is not signalized under the no-build condition, but is signalized for all of the build alternatives.

For segment 3 of Stockdale Highway, where mobility is critical, the determination of level of service on Class I highways is based on the average travel speed. On Class II highways, where mobility is less critical, the level of service is based on the percent time spent following. The correlation between these measures of effectiveness and highway level of service is shown in Table 4-41.

Table 4-41. Two-Lane Highway Level of Service Definitions

LEVEL OF SERVICE	DESCRIPTION	PERCENT TIME SPENT FOLLOWING (%)	AVERAGE TRAVEL SPEED (mph)
A	A condition of free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver desire, speed limits, and physical road conditions.	≤35%	>55
B	A condition of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation.	>35 to 50%	>50 to 55
C	A condition of stable flow, but speed and maneuverability are more adversely affected by higher traffic volumes. Most drivers are restricted in their freedom to select their own speed, change lanes, or pass.	>50 to 65%	>45 to 50
D	Conditions approach unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuation in volume and temporary restrictions may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, and comfort and convenience are low, but conditions can be tolerated for short periods of time.	>65 to 80%	>40 to 45
E	Represents operation at speeds lower than in Level D, with volumes at or near the capacity of the highway.	>80%	≤40
F	Represents forced-flow operations at low speeds, where volumes are below capacity. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of the downstream congestion. In the extreme, both speed and volume can drop to zero.		

The results of the highway segment analysis are presented in Table 4-42. They indicate that Stockdale Highway operates, and will continue to operate, below Caltrans (District 6) level of service threshold of the transition between LOS C and LOS D for rural roads (Stockdale Highway west of Enos Lane) or the transition between LOS D and LOS E for urban roads (Stockdale Highway east of Enos Lane).

State Route 58/State Route 99 Interim Connections

The build alternatives A, B, and C do not provide direct connector ramps to or from the north on State Route 99 as part of the Centennial Corridor project. The preliminary plans presented earlier in this chapter allow for these ramps to be constructed a future date. Interim access will be provided by the State Route 99 interchange with existing State Route 58 (west), connecting to the Westside Parkway via Mohawk Street.

As part of the build alternatives, the project will improve the southbound State Route 99 off-ramp to Rosedale Highway. To provide an acceptable level of service, the number of turn lanes will need to be improved from one left-turn plus one shared left- and right-turn lane to two left-turn lanes and two free-right turn lanes. The additional turn lanes will each be 12 feet wide.

In addition to this ramp termini intersection improvement, Rosedale Highway will be widened from two lanes per direction to three lanes per direction to the west of Gibson Street to Mohawk Street and beyond. This widening of Rosedale Highway is a separate project which will be constructed with or without the Centennial Corridor project.

Figure 4-26 illustrates the interim route connection between the Westside Parkway and State Route 99, to and from the north. The route covers 2.1 miles from the State Route 99/Rosedale Highway undercrossing to the Westside Parkway/Mohawk Street overcrossing.

Table 4-42. Highway Segment Analysis Results—Stockdale Highway*

SEGMENT	ALTERNATIVE	PEAK HOUR	PERCENT TIME SPENT FOLLOWING (%)	AVERAGE TRAVEL SPEED (mph)	VOLUME/CAPACITY	LEVEL OF SERVICE
I-5 to State Route 43	Existing	AM	32.5%	55.2	0.14	A
		PM	42.4%	54.4	0.22	B
	No-build	AM	61.9%	50.8	0.34	B
		PM	73.6%	48.6	0.49	C
	A	AM	64.5%	50.3	0.36	B
		PM	75.7%	48.1	0.51	C
	B	AM	64.2%	50.4	0.36	B
		PM	74.4%	48.4	0.50	C
	C	AM	64.1%	50.4	0.36	B
		PM	75.2%	48.2	0.51	C
State Route 43 to Nord Road	Existing	AM	46.4%	53.0	0.23	B
		PM	55.6%	51.7	0.34	B
	No-build	AM	79.5%	45.8	0.46	C
		PM	86.6%	43.4	0.61	D
	A	AM	80.6%	45.4	0.47	C
		PM	87.5%	43.1	0.64	D
	B	AM	80.4%	45.5	0.47	C
		PM	87.3%	43.3	0.63	D
	C	AM	80.4%	45.5	0.47	C
		PM	87.1%	43.1	0.63	D

*Assumes two-lane, two-way highway

A southbound State Route 99 to westbound Westside Parkway motorist following the interim connecting route would pass through four signalized intersections; while an eastbound to northbound motorist would pass through seven signalized intersections.

The year 2038 level of service computed for these intersections is LOS D or better except at the intersection of Mohawk Street and Rosedale Highway. These expected operational conditions are summarized on Table 4-43.

Insofar as the build alternatives, providing direct connector ramps to/from the north on State Route 99 would lengthen the route traveled, but this journey would occur at a higher rate of speed. Table 4-44 summarizes the relative change in distance and travel time.

Based on this assessment of motorist delay and increased vehicle miles traveled, direct connector ramps from Westside Parkway to/from State Route 99 (north) will be deferred until sometime following year 2038, or when demand and traffic operating conditions along the interim route warrant.



Figure 4-26: Interim Connection between Westside Parkway and State Route 99

Table 4-43. Ramp Termini and Intersection Level of Service (2038)

EB/ NB	SB/ WB	INTERSECTION	NO- BUILD	A	B	C
•		Mohawk Street/Westside Parkway eastbound ramps	C/B	B/B	B/B	B/B
•	•	Mohawk Street/Westside Parkway westbound ramps	NA	NA	B/A	B/A
•	•	Mohawk Street/Rosedale Highway	F/F	E/F	E/F	E/F
•	•	Rosedale Highway/Landco Drive	C/C	B/B	B/B	B/B
•	•	Rosedale Highway/Gibson Street	C/C	B/D	B/D	B/D
•	•	Rosedale Highway/Costco Entrance	A/B	A/C	A/C	A/C
•	•	Rosedale Highway/Camino Del Rio Court	C/D	C/D	C/D	C/D
•	•	Rosedale Highway/State Route 99 southbound ramps	C/D	C/C	C/C	C/C
•		Rosedale Highway/State Route 99 northbound off-ramp	C/C	C/D	C/D	C/D
•		Buck Owens Boulevard/State Route 99 northbound ramps	D/D	D/D	D/D	D/D

Table 4-44. Comparative Distance and Travel Time from Westside Parkway to/from State Route 99 North

	LENGTH (miles)*	DELTA	
		MILES	TIME (min)**
Interim route	2.6	0	0
Alternative A (with future ramps)	4.5	+1.9	0 to -5
Alternative B (with future ramps)	4.9	+2.3	0 to -5
Alternative C (with future ramps)	2.7	+0.1	-2 to -7

*State Route 99/Rosedale Highway undercrossing to 0.55 miles west of Westside Parkway/Mohawk Street overcrossing.

**Change in travel time during off-peak and peak hours.

Independent Utility and Logical Termini

Federal Highway Administration regulations (23 Code of Federal Regulations 771.111[f]) require that (1) projects have logical limits and be long enough that the environmental analysis has a broad scope; (2) projects are usable and a reasonable use of funds, even if no additional transportation improvements in the area are made (this is known as independent utility); and (3) approval of a project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements. As discussed below, the Centennial Corridor project build alternatives A, B, and C comply with these requirements.

Both the ultimate project (construction of all three roadway segments) and phased project (construction by segment) have logical limits. The ultimate project would provide a freeway facility that connects State Route 58 with State Route 99 and Interstate 5 at freeway-to-freeway interchanges. The segment 1 project would close a gap by connecting State Route 58 (east) with the new Westside Parkway (segment 2). The connecting ramps from State Route 58 (west) to and from State Route 99 (south) would be constructed as part of the Centennial Corridor project. Connecting ramps from State Route 58 (west) to and from State Route 99 (north) would be

constructed at a later date. Insofar as the connection to Interstate 5, segments 1 and 2 and Stockdale Highway would serve the developed portion of metropolitan Bakersfield by moving traffic, goods, and freight through the area, and would provide access to Interstate 5 for improved regional access. The ultimate segment 3 freeway facility would connect Interstate 5 with the west end of the Westside Parkway at the point in time when the travel demand exceeds the capacity of Stockdale Highway (a two-lane roadway). Identifying segment 3 as a future alignment for State Route 58 will allow preservation of an adequate transportation corridor in the future. Combined with the existing State Route 58 (east), the project would provide a high capacity, high level of service, east–west facility in the San Joaquin Valley.

Another important consideration is whether the project is of sufficient length to address traffic and environmental related matters on a broad scope. At 17.4 to 18.5 miles long (depending on the alternative), the study corridor extends well beyond the proposed construction limits. This ensures that the traffic issues that would be addressed in detail if construction of segment 3 and the State Route 58 (west)/State Route 99 (north) direct connector ramps, as proposed in the future, are considered at a Tier I planning level now.

The project's phased implementation would provide an effective and efficient roadway even if no additional transportation improvements are made. As discussed earlier in this chapter, the connection of segment 1 and segment 2 would provide an adequate traffic level of service through 2038 (the project's design year). Finally, there are no other projects that would be needed or are dependent on construction of the Centennial Corridor project.

CHAPTER 5. COST AND BENEFITS OF THE BUILD ALTERNATIVES

The build alternatives would provide additional capacity along State Route 58 compared with the no-build alternative. Descriptions of the build alternatives are provided in Chapter 4. This chapter identifies the costs and estimated benefits associated with implementing the build alternatives. The no-build alternative considered by this analysis is the 2035 Regional Improvements Only scenario.

5.1 Cost Estimates

Cost estimates were developed by HNTB for the *Project Study Report* and by Parsons for the *Project Report*. The preliminary cost estimate for the build alternatives ranges from \$252 million to \$691 million, excluding project engineering and administration. These costs reflect year of expenditure dollars.

Table 5-1 provides a summary of the capital cost for build alternatives A, B, C, and M.

Table 5-1. Capital Cost for Build Alternatives (\$ 2016 mid-point of expenditure)

ELEMENT	ALTERNATIVE M COST	ALTERNATIVE A COST	ALTERNATIVE B COST	ALTERNATIVE C COST
Roadway	\$ 99,000,000	\$296,505,000	\$255,988,000	\$275,849,000
Structures	53,000,000	140,564,000	133,958,000	176,242,000
Right-of-Way	100,000,000	253,894,000	180,000,000	213,788,000
Total Project Capital Cost (rounded)	\$252,000,000	\$690,963,000	\$569,946,000	\$665,879,000

5.2 Benefits Estimates

Chapter 3 identified that with the build alternatives, traffic volumes could be expected to shift from parallel arterial streets to the upgraded State Route 58, thereby relieving congestion on a system-wide basis. Because the upgrade of State Route 58 west has system-wide impacts, its benefits were computed using STEAM 2.0 (Surface Transportation Efficiency Analysis Module), a system-wide analysis tool.

As discussed in Section 3.5, the Federal Highway Administration introduced the first version of STEAM in 1997. STEAM was the first Federal Highway Administration impact analysis product to use input directly from the four-step travel demand modeling process for detailed, system wide analysis of alternative transportation investments on regional and corridor levels. The Federal Highway Administration released STEAM 2.0 in 2000 to expand the scope of the model to address environmental justice measures.

Inputs obtained for each alternative from the regional four-step models include person-trip matrices by mode and purpose and vehicle-trip matrices for personal vehicles and internal truck travel; trip time and cost matrices skimmed from the highway and transit networks; and loaded

highway network link volumes. The personal travel modes include auto, carpool, bus, walk-accessed light rail and drive-accessed light rail for trip purposes home based work, home based college, home based other, and non-home based, as well as for external-internal and external-external (through) auto trips. To simplify the STEAM analysis, all trips are combined into one aggregate person-trip matrix for each of the five modes, and one truck trip matrix. Vehicle occupancies and estimates of the proportions of zone-to-zone trips are obtained from manipulation of the available trip matrices.

Selected results categories produced through STEAM analysis include the following:

- Weekday vehicle-miles (millions)
- Average highway speed (mph)
- Annual fuel use (million gal)
- Annual user benefits
- Total agency revenues
- Emission benefits
- Other external benefits
- Total annual benefits
- Annualized capital costs
- Annual operating costs
- Total annualized costs
- Net annual worth
- Simple benefit-cost ratio

STEAM incorporates a sophisticated network speed and delay estimation technique based on off-line simulations which incorporate the dynamic effects of queuing and peak-spreading, day-to-day variations in traffic levels, as well as the impacts of incident delays, based on their expected occurrence. Accident costs are based on zone-to-zone vehicle-miles and link types, and divided into "perceived" costs, included in user benefit estimation, and "non-perceived" costs, which are included as external costs. Fuel cost savings are estimated using zone-to-zone average speeds and fuel consumption rates for autos and trucks.

Benefits are estimated based on weekday travel estimates, annualized, and expanded through the lifetime of the investment. User benefits for new users attracted by time or cost savings to an alternative, relative to the base case, are evaluated at 50% the rate applied to former users, as suggested by consumer surplus theory. Negative benefits of patronage lost due to poorer travel conditions are estimated similarly. The analysis year is chosen to be representative of benefits over the entire analysis time period. Alternatively, the program may be applied for several different analysis years, from which it determines the total stream of benefits that are then annualized. Investment costs are also annualized and combined with representative annual public agency operating costs. The program includes a large library of default unit costs and parameter values that can be modified as desired.

The STEAM 2.0 speed models account for delays due to incidents using data on the frequency, severity, and duration of incidents. Incidents account for a large share of total travel delays due to congestion, especially on freeways. The models also account for peak spreading that occurs

when facilities become more congested. The traffic temporal distributions used in developing the models were based on data collected from 579 urban automatic traffic recorders across the nation. Separate temporal distributions were developed for freeways and arterials with low, moderate, and high ratios of average daily traffic to capacity.

The models further account for day-to-day variations in traffic. The relationship between delays due to congestion and traffic volumes are highly non-linear in nature, especially when the ratio of demand volume to capacity is close to 1.0. Lastly, the STEAM 2.0 speed models account for the decrease in highway capacity that occurs after demand volumes exceed capacity.

Travel Time Savings

Vehicle hours of travel were computed for each link in the highway system. Highway link travel speeds and volumes were output directly from the Kern COG 2006 Regional Travel Demand Model TP+ software to STEAM 2.0 using a custom design interface. This program interface is now available for use with any Kern COG Model/STEAM 2.0 application.

Consistent with U.S. Department of Transportation guidance for the valuation of travel time in economic analysis, Parsons assumed local personal travel to be valued at 50 percent of the local median wage rate. Business travel by truck and bus drivers was valued at 100 percent of the mean wage for these occupations, plus fringe benefits. Kern County's mean wage for all occupations was reported by the State of California Employment Development Department to be \$21.66 per hour for the first quarter of 2011; hence, a value of time equal to \$10.83 per hour was used for local personal travel. The state reported that heavy truck drivers residing in Kern County earned \$19.17 per hour on average in the first quarter of 2011. A fringe benefit rate of 50 percent of the mean wage was assumed by Parsons for bus and truck drivers, based on an equal mix of employees covered by teamsters (55.5 percent) and other (44.5 percent) labor agreements. The corresponding value of time for these business travelers was thus estimated to be \$28.76 per hour.¹

Computation of benefits also took vehicle occupancy into account for local personal travel. Based on the Kern COG model, the average daily vehicle occupancy for all trip purposes in Kern County is estimated to be 1.44 persons per vehicle. While this average occupancy may be lower or higher during peak periods, the average rate was assumed for the benefits calculation for lack of better data.

Crash Benefits

The frequency of accident occurrence is typically lower on freeways and expressways when compared to other types of regional roads and city streets. To compute benefits associated with the build alternative versus the no-build alternative, the number of vehicle miles traveled over the highway system was computed for each alternative, using the Kern COG Model and STEAM 2.0.

¹ Benefits for heavy and tractor-trailer truck trips are under-reported, as the Kern COG model commingles auto and truck trips in the internal-external and external-external trip matrices. To compensate, a higher value of time (\$35.37) was utilized in the calculation of in-vehicle travel time cost. Auto value of time is assumed for internal-external and external-external trips.

Rates of crash occurrences resulting in fatalities, personal injuries, and property damage only were obtained from the California Highway Patrol, Caltrans for Year 2008. Statewide rates listed in Table 5-2 are for state owned facilities, and do not include the majority of urban arterial, local and collector streets.

Table 5-2. California Crash Rates on State Highways (Year 2008)*

FUNCTIONAL CLASSIFICATION	PDO CRASH RATE	INJURY CRASH RATE	FATAL CRASH RATE
All	85.64	52.34	0.96

Source: California Highway Patrol, California Department of Transportation

*Crash rates per 100 million vehicle miles.

To develop a more comprehensive set of crash occurrence rates, statewide data available from the Nevada Department of Transportation was obtained and benchmarked to match California crash rates for similar type facilities (interstate rural, interstate urban, urban principal arterial, and principal arterial urban).

The resulting crash rates used for the STEAM 2.0 calculation of benefits are listed in Table 5-3.

Table 5-3. California Crash Rates by Functional Roadway Classification*

FUNCTIONAL CLASSIFICATION	PDO CRASH RATE	INJURY CRASH RATE	FATAL CRASH RATE
Interstate urban	105.49	52.93	0.43
Other urban freeways and expressways	83.62	46.39	0.74
Urban principal arterials	148.57	98.57	0.87
Urban minor arterials	123.65	86.61	1.33
Urban collector streets	84.91	56.02	0.65
Urban local streets	97.32	42.98	0.56

Source: Parsons, based on Caltrans 2008 and Nevada Department of Transportation 2003 data.

*Crash rates per 100 million vehicle miles.

The values of loss associated with accidents were obtained from the National Safety Council (2008) and the California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C). Periodically, the National Safety Council estimates the average cost of fatal and non-fatal injuries due to motor vehicle crashes. These estimates are made using a comprehensive or willingness to pay method.

After adjusting these estimates to year 2011 using the gross domestic product deflator, values of \$4,919,000 per fatality, \$69,080 per injury, and \$10,050 per reported property damage only (PDO) accident were derived.

Taking inflation into account, these estimates of accident costs compare favorably with values used in five computerized benefit-cost models, as reported in Table 5-4.

Table 5-4. Accident Cost Estimates

ACCIDENT TYPE	CSI* (\$ 1993)	StratBENCOST** (\$ 1996)	STEAM† (\$ 1997)	RAILDEC‡ (\$ 1997)	Cal-B/C (\$ 2007)
Fatality	\$3,325,095	\$3,521,359	\$2,726,350	\$3,613,137	\$4,600,000
Injury	\$ 7,890	\$ 83,848	\$ 59,718	\$ 86,033	\$ 64,600
PDO	\$ 5,651	\$ 5,806	\$ 3,322	\$ 5,957	\$ 9,400

* Cambridge Systematics, Inc. (CSI), Approaches for Developing Nationwide Estimates of Congestion Delay, Accidents, Emissions, and Noise Impacts: Interim Report, 1995.

** NCHRP Project 2-18(3), Development of an Innovative Highway User Cost Estimation Procedure. Midrange of costs reported.

† FHWA, Surface Transportation Efficiency Analysis Model, 1997. Total of internal and external costs.

‡ Companion to StratBENCOST which estimates the reduction in accident costs as the change in highway accidents between the base and alternative (rail) case. StratBENCOST values inflated by 2.6 percent for all accident types.

¶ California Life-Cycle Benefit/Cost Analysis Model, Technical Supplement to User's Guide, February 2009.

STEAM 2.0 calculates separate internal and external accident costs. Internal accident costs are defined as costs inflicted upon and perceived by transportation facility users. External costs are defined as costs inflicted on users, but not perceived by users. Table 5-5 identifies the breakdown of these accident cost assumptions.

Table 5-5. Accident Cost Assumptions for STEAM (\$ 2011)

ACCIDENT TYPE	INTERNAL COST	EXTERNAL COST	TOTAL COST
Fatality	\$4,181,150	\$737,850	\$4,919,000
Injury	\$ 58,720	\$ 10,360	\$ 69,080
PDO	\$ 8,540	\$ 1,510	\$ 10,050

Source: Parsons

Motor Vehicle Emissions and Costs

STEAM 2.0 calculates the motor vehicle emissions listed in Table 5-6. Rates of motor vehicle emissions were obtained from the Cal-B/C for carbon monoxide (CO), nitrogen oxides (NO_x), and fine particulates (PM₁₀) assuming a vehicle model year of 2027. The source of these emission rates is the California Air Resources Board EMFAC 2007 V2.3 model. STEAM 2.0's default values for hydrocarbon emissions were also used in the analysis. These rates assume a Year 2010 vehicle model year and are based on the EPA's Mobil 5a model results.

Monetary values for CO, PM₁₀ and NO_x emissions were obtained from research by Donald McCubbin and Mark Delucchi reported in "The Social Cost of Health Effects of Motor-Vehicle Use in the United States," as updated for use in the Cal-B/C, and adjusting these estimates to 2011 using the gross domestic product deflator. Values reported for the Los Angeles/South Coast air basin (see Table 5-7) were used for the evaluation of benefits.

The health cost of hydrocarbon (HC) emissions was taken from a second source that also valued NO_x.² These values were indexed to the Cal-B/C values to estimate the per ton cost of HC.

² Gunnar Linberg, Benefit-Cost Analysis in a Multimodal Planning Process, "Exploring the Application of Benefit-Cost Methodologies to Transportation Decision Making," May 1995, Tampa, Florida.

Table 5-6. Vehicle Pollution Emissions

EMISSION	DESCRIPTION	SOURCE	HARMFUL EFFECTS	SCALE
Carbon monoxide, CO	A toxic gas that undermines blood's ability to carry oxygen	Engine	Human health, climate change	Very local
Nitrogen oxides, NO _x	Various compounds; some are toxic, all contribute to ozone.	Engine	Human health, ozone precursor	Regional
Fine particulates, PM ₁₀	Inhalable particles consisting of bits of fuel and carbon	Diesel engines and other sources	Human health, aesthetics	Local and regional
Hydrocarbons, HC	Unburned fuel; forms ozone	Fuel production and engines	Human health, ozone precursor	Regional

Table 5-7. Health Cost of Motor Vehicle Emissions (2010 \$/ton)

EMISSION	VALUE
Carbon monoxide CO	\$ 143
Fine particulates PM ₁₀	\$486,207
Nitrogen oxides NO _x	\$ 59,325
Hydrocarbons HC	\$ 8,510

Source: Parsons, based on California Life-Cycle Benefit/Cost Analysis Model, Technical Supplement to User's Guide, 2009

While STEAM 2.0 calculates motor vehicle emissions as described above, other technical studies perform more precise calculations. As a result, the STEAM 2.0 estimates of motor vehicle emissions are not reported in this traffic report.

Global Warming

Global warming refers to the warming of Earth's atmosphere due to the greenhouse effect. Incoming solar energy, including certain wavelengths of infrared radiation, passes through Earth's atmosphere and reaches the surface of Earth, thus warming it. Some of the infrared radiation emitted from Earth's surface returns back to the atmosphere where it is absorbed by certain atmospheric gases called greenhouse gases. The absorption of infrared by these green gases warms the atmosphere of Earth in a way similar to the way a greenhouse captures solar energy and warms the air inside it.

The major greenhouse gases include carbon dioxide, water vapor (H₂O), and methane (CH₄), as well as nitrous oxide (N₂O), fluorocarbons, and ozone. Carbon dioxide (CO₂) is the greenhouse gas that is of greatest concern due to its large atmospheric concentration with respect to other greenhouse gases and the large amounts emitted.

STEAM calculates changes in greenhouse gas emissions using carbon dioxide (CO₂) emission rates per gallon of motor fuel consumed. These estimates are considered to be less precise than those computed by other technical studies reported elsewhere. As a result, the STEAM 2.0 estimates of greenhouse gas emissions are not reported in this traffic report.

Vehicle Operating Costs

Vehicle operating costs were calculated for the no-build alternative and the build alternatives using estimates of vehicle miles traveled produced by the Kern COG Regional Transportation Model and STEAM 2.0. STEAM 2.0 calculates fuel consumption per gallon based on average link speeds and vehicle miles traveled per link.

Default values for the fuel consumption rates used in STEAM come from the Institute of Transportation Engineers “Transportation Planning Handbook,” 1992. However, these rates were derived from a study published by Caltrans in 1983. Non-fuel volatile organic compounds are taken from a U.S. Department of Transportation publication, “Characteristics of Urban Transportation Supply,” 1992, and are converted to 1997 dollars. These costs originated in the American Automobile Association publication, “Your Driving Costs.”

For the evaluation of benefits, fuel consumption was based on estimates of average fuel consumption for the Year 2007 obtained from the California Air Resources Board’s Motor Vehicle Emission Inventory models. These rates, used in the Cal-B/C, are reported in Table 5-8.

Table 5-8. Fuel Consumption Rates (gallons/mile)

SPEED	AUTO	TRUCK
5	0.1519	0.2967
10	0.1135	0.2649
15	0.0877	0.2148
20	0.0704	0.1779
25	0.0588	0.1588
30	0.0509	0.1479
35	0.0458	0.1399
40	0.0426	0.1341
45	0.0412	0.1303
50	0.0411	0.1283
55	0.0426	0.1282
60	0.0457	0.1301
65	0.0507	0.1343
70	0.0542	0.1415

Source: Cal-B/C, California Air Resources Board, EMFAC 2007 V2.3, 2007 and 2027 average

The price-per-gallon of regular grade gasoline was assumed to be \$3.689 per gallon based on prices prevailing in the Bakersfield metropolitan area in January 2012. STEAM 2.0 separates fuel costs into tax and non-tax components, using the tax portion to compute “revenue transfers.” The tax rate per gallon of gasoline was assumed to be 18.4 cents Federal, 35.7 cents State excise, 2.0 cents Underground Storage Tank fee, and 21.14 cents State sales tax. These taxes total 77.24 cents per gallon. Truck fuel costs were assumed to be \$3.50 per gallon for the non-tax portion and \$0.6478 for the tax component.

Non-fuel costs for vehicle maintenance and tire expense were assumed to be \$0.0567 per mile for automobiles based on American Automobile Association's "Your Driving Costs," 2011 edition, and \$0.121 per mile for trucks based on Center for Transportation Analysis, Department of Energy statistics for calendar year 2004. The STEAM 2.0 model does not include mileage-based depreciation.

5.3 Summary of Benefits

The build alternatives will produce net savings in travel time and vehicle operating expense, and increased emissions and crashes. These findings are summarized in Table 5-9 and are discussed below.

Table 5-9. Summary of Centennial Corridor Project Benefits (Year 2038)

BENEFIT TYPE	BUILD ALTERNATIVE M	BUILD ALTERNATIVE A	BUILD ALTERNATIVE B	BUILD ALTERNATIVE C
User Benefits				
In-vehicle travel time	\$ 16,259,900	\$ 64,133,300	\$ 60,348,900	\$ 64,691,200
Fuel costs	2,576,200	6,395,300	5,149,700	5,898,300
Non-fuel operating costs	(213,000)	(2,248,500)	(3,002,300)	(3,159,400)
Internal accident costs	3,857,300	7,920,100	5,645,600	6,087,000
Revenue Transfers	\$ (680,200)	(1,699,500)	\$ (1,370,700)	\$ (1,568,400)
Reduction in External Costs				
Emissions Global warming Noise	See detailed technical studies			
Accident Other mileage based	\$ 474,500 0	\$ 973,500 0	\$ 694,500 0	\$ 748,800 0
Total Benefits \$/year in 2038	\$ 22,274,700	\$ 75,264,200	\$ 68,836,400	\$ 72,697,500
Total Benefits \$/year in 2018	32,030,800	7,759,000	14,266,100	30,803,200
Life Cycle Benefits 2018–2040 Total	\$605,287,000	\$1,030,458,000	\$1,014,868,000	\$1,230,735,000

Source: Parsons, based on STEAM 2.0

In Vehicle Travel Time

Travel time benefits are significant, as motorists are able to shift routes to higher speed facilities and additionally benefit from increased network capacity. This category of user benefit constitutes the majority of total benefits computed for the build alternatives.

Fuel Costs

Fuel costs decrease with the build alternatives as a result of automobiles traveling at higher speeds. As indicated in Table 5-7, automobiles consume fuel at the lowest rates while traveling between 35 mph and 60 mph.

Non-Fuel Operating Costs

Non-fuel operating costs are based on vehicle miles traveled. Vehicle miles traveled increases for the build alternatives as motorists seek higher speed routes; hence, non-fuel operating costs increase.

Accidents

As indicated in Table 5-2, crash rates for property damage and injuries are highest for urban principal arterials, and lowest for urban freeways and expressways. Table 3-3, reported earlier, indicates the proportion of vehicle miles traveled by functional roadway classification. The build alternatives shift more vehicle miles traveled to State Route 58 west, resulting in a decrease in crashes of all types.

Revenue Transfers

Revenue transfers are the tax portion of fuel costs, which are collected or not collected as a result of increased or decreased fuel consumption. Fuel cost savings produce a net loss of revenue transfers. Increased fuel use produces additional tax revenue.

Emissions

Vehicle pollution costs computed by STEAM 2.0 are not reported, but are relatively minor compared with other traffic related benefits.

Global Warming

Global warming benefits (or disbenefits) computed by STEAM 2.0 are not reported, but are positive (provide benefits) for all build alternatives.

The appendix of this document contains detailed STEAM 2.0 model output by mode and market sector.

Total Benefits

Table 5-9 indicates that benefits accrued by the transportation systems management alternative (alternative M) in year 2038 will total \$22.3 million, while the benefits accrued during the first full year of operation, year 2018, will total a higher amount of \$32.0 million. This anomaly results from the proposed super-arterial accommodating opening year traffic demands at higher speeds during its early years of operation, while traffic slows in later years as the facility becomes more congested. Alternatives A and B, on the other hand, are lightly used upon opening day, with traffic volumes and benefits increasing as time goes on. The benefits attributable to the full build alternatives A, B and C are thus increasing over time while the transportation systems management alternative benefits are declining.

5.4 Life Cycle Benefits and Costs

Benefits of the build alternatives will accrue over time as traffic volumes increase from the opening day (second quarter of 2018) to those forecast for 2038. A measurement of life-cycle benefits, assuming a straight line projection of traffic growth, is reported in Tables 5-10 through 5-13, with each table reporting life-cycle benefits and costs for an individual build alternative.

The benefits reported for 2018 represent three-quarters of one year; hence, the values are 75 percent of the full year estimation for 2018.

Table 5-10. Alternative M Life Cycle Benefits and Costs (\$1,000)

YEAR	TOTAL BENEFITS	TOTAL COSTS	PRESENT VALUE DISCOUNT	PRESENT VALUE BENEFITS	PRESENT VALUE COSTS
2011			1.0000		
2012			0.9804		
2013			0.9612		
2014		\$ 50,000	0.9423		\$ 47,115
2015		50,000	0.9238		46,190
2016		67,500	0.9057		61,135
2017		67,500	0.8880		59,940
2018	\$ 24,023*	17,000	0.8706	\$ 20,914	14,800
2019	31,543		0.8535	26,922	
2020	31,055		0.8368	25,987	
2021	30,567		0.8203	25,074	
2022	30,080		0.8043	24,193	
2023	29,592		0.7885	23,333	
2024	29,104		0.7730	22,497	
2025	28,616		0.7579	21,688	
2026	28,128		0.7430	20,899	
2027	27,641		0.7284	20,134	
2028	27,153		0.7142	19,393	
2029	26,665		0.7002	18,671	
2030	26,177		0.6864	17,968	
2031	25,689		0.6730	17,289	
2032	25,202		0.6598	16,628	
2033	24,714		0.6468	15,985	
2034	24,226		0.6342	15,364	
2035	23,738		0.6217	14,758	
2036	23,250		0.6095	14,171	
2037	22,763		0.5976	13,603	
2038	22,275		0.5859	13,051	
2039	21,787		0.5744	12,514	
2040	21,299		0.5631	11,993	
Totals	\$605,287	\$252,000		\$433,029	\$229,180

*Reflects 9 months of 2018

Table 5-11. Alternative A Life Cycle Benefits and Costs (\$1,000)

YEAR	TOTAL BENEFITS	TOTAL COSTS	PRESENT VALUE DISCOUNT	PRESENT VALUE BENEFITS	PRESENT VALUE COSTS
2011			1.0000		
2012			0.9804		
2013			0.9612		
2014		\$ 126,947	0.9423		\$119,622
2015		126,947	0.9238		117,274
2016		194,253	0.9057		175,935
2017		194,253	0.8880		172,497
2018	\$ 5,819*	48,563	0.8706	\$ 5,066	42,279
2019	11,134		0.8535	9,503	
2020	14,510		0.8368	12,142	
2021	17,885		0.8203	14,671	
2022	21,260		0.8043	17,099	
2023	24,635		0.7885	19,425	
2024	28,011		0.7730	21,653	
2025	31,386		0.7579	23,787	
2026	34,761		0.7430	25,827	
2027	38,136		0.7284	27,778	
2028	41,512		0.7142	29,648	
2029	44,887		0.7002	31,430	
2030	48,262		0.6864	33,127	
2031	51,637		0.6730	34,752	
2032	55,013		0.6598	36,298	
2033	58,388		0.6468	37,765	
2034	61,763		0.6342	39,170	
2035	65,138		0.6217	40,496	
2036	68,514		0.6095	41,759	
2037	71,889		0.5976	42,961	
2038	75,264		0.5859	44,097	
2039	78,639		0.5744	45,170	
2040	82,015		0.5631	46,183	
Totals	\$1,030,458	\$690,963		\$679,807	\$627,607

*Reflects 9 months of 2018

Table 5-12. Alternative B Life Cycle Benefits and Costs (\$1,000)

YEAR	TOTAL BENEFITS	TOTAL COSTS	PRESENT VALUE DISCOUNT	PRESENT VALUE BENEFITS	PRESENT VALUE COSTS
2011			1.0000		
2012			0.9804		
2013			0.9612		
2014		\$ 90,000	0.9423		\$ 84,807
2015		90,000	0.9238		83,142
2016		173,309	0.9057		156,966
2017		173,310	0.8880		153,899
2018	\$ 10,700*	43,327	0.8706	\$ 9,315	37,720
2019	16,995		0.8535	14,505	
2020	19,723		0.8368	16,504	
2021	22,452		0.8203	18,417	
2022	25,180		0.8043	20,252	
2023	27,909		0.7885	22,006	
2024	30,637		0.7730	23,682	
2025	33,366		0.7579	25,288	
2026	36,094		0.7430	26,818	
2027	38,823		0.7284	28,279	
2028	41,551		0.7142	29,676	
2029	44,280		0.7002	31,005	
2030	47,008		0.6864	32,266	
2031	49,737		0.6730	33,473	
2032	52,465		0.6598	34,616	
2033	55,194		0.6468	35,699	
2034	57,922		0.6342	36,734	
2035	60,651		0.6217	37,707	
2036	63,379		0.6095	38,630	
2037	66,108		0.5976	39,506	
2038	68,836		0.5859	40,331	
2039	71,565		0.5744	41,107	
2040	74,293		0.5631	41,834	
Totals	\$1,014,868	\$569,946		\$677,650	\$516,534

*Reflects 9 months of 2018

Table 5-13. Alternative C Life Cycle Benefits and Costs (\$1,000)

YEAR	TOTAL BENEFITS	TOTAL COSTS	PRESENT VALUE DISCOUNT	PRESENT VALUE BENEFITS	PRESENT VALUE COSTS
2011			1.0000		
2012			0.9804		
2013			0.9612		
2014		\$ 106,894	0.9423		\$100,726
2015		106,894	0.9238		98,749
2016		200,929	0.9057		181,981
2017		200,930	0.8880		178,426
2018	\$ 23,102*	50,232	0.8706	\$ 20,113	43,732
2019	32,898		0.8535	28,078	
2020	34,993		0.8368	29,286	
2021	37,087		0.8203	30,422	
2022	39,182		0.8043	31,514	
2023	41,277		0.7885	32,547	
2024	43,371		0.7730	33,526	
2025	45,466		0.7579	34,459	
2026	47,561		0.7430	35,338	
2027	49,656		0.7284	36,169	
2028	51,750		0.7142	36,960	
2029	53,845		0.7002	37,702	
2030	55,940		0.6864	38,397	
2031	58,034		0.6730	39,057	
2032	60,129		0.6598	39,673	
2033	62,224		0.6468	40,246	
2034	64,319		0.6342	40,791	
2035	66,413		0.6217	41,289	
2036	68,508		0.6095	41,756	
2037	70,603		0.5976	42,192	
2038	72,698		0.5859	42,594	
2039	74,792		0.5744	42,961	
2040	76,887		0.5631	43,295	
Totals	\$1,230,735	\$665,879		\$838,365	\$603,614

*Reflects 9 months of 2018

Tables 5-10 through 5-13 reflect a 30-year analysis period covering both expenditures (costs) and benefits. Both benefits and costs are discounted to reflect the time value of resources (or money). This time value of money represents the opportunity cost that could be earned by using the dollars for some other investment.

Each year, the U.S. Office of Management and Budget updates discount rates in accord with Office of Management and Budget Circular No. A-94, “Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.” States typically use the “Real interest rates on Treasury Notes and Bonds” for discounting highway investments. These rates do not include the effects of inflation.

The real interest rate for a 30-year bond has fallen steadily over the past decade. The rate currently stands at 2.0 percent, and this rate was used for the economic analysis reported in this document.

Table 5-14 summarizes the results of the life-cycle benefits and costs. As noted above, this analysis covers a 30-year time period to encompass expenditures to acquire right-of-way and to construct the project, and benefits which accrue as a result of the project. The accumulation of benefits covers a 22.75-year time span.

Table 5-14. Summary of Life-Cycle Benefits and Costs

METRIC	BUILD ALTERNATIVE M	BUILD ALTERNATIVE A	BUILD ALTERNATIVE B	BUILD ALTERNATIVE C
Cost	\$252,000,000	\$ 690,963,000	\$ 569,946,000	\$ 665,879,000
Present value of costs	\$229,180,000	\$ 627,607,000	\$ 516,534,000	\$ 603,614,000
Total benefits (Q2 2018–2040)	\$605,287,000	\$1,030,458,000	\$1,014,868,000	\$1,230,735,000
Present value of benefits	\$433,029,000	\$ 679,807,000	\$ 677,650,000	\$ 838,365,000
Present value benefit/cost ratio	1.9	1.1	1.3	1.4
Payback period	10 years	22 years	19 years	18 years

The table indicates the following.

Transportation Systems Management (TSM) Alternative M

The TSM alternative performs well because it provides immediate traffic relief to Rosedale Highway, which is congested. Access to all roadways via the existing freeway system (as of 2018) is maintained, thus motorists do not need to rearrange their travel patterns. Over time, the overall highway system becomes increasingly congested and speeds decrease. The TSM alternative does not provide sufficient capacity enhancement to address long-range needs; hence, benefits decline over time. Due to a strong start upon project opening, benefits on average are relatively high over its life-cycle. Coupled with the lower cost of implementation, the benefit to cost ratio is high relative to the other, more expensive, build alternatives.

Alternative A

Alternative A provides the least benefits in the near-term and the most benefits in the long term compared to the other build alternatives. By virtue of the low generation of benefits in the early years and higher overall implementation costs, this alternative has the least favorable ratio of benefits to costs and requires the longest time over the 30-year analysis period to repay the investment. The lower accumulation of benefits following the opening year results from three factors.

- The highway network is least congested in the early years.
- Existing travel patterns are disrupted by the closure of State Route 58 access to Real Road and State Route 99 access to Wible Road. Both of these connections provide access to the Stockdale Highway corridor; hence, motorists must find alternate, and more time consuming routes to reach their destination.
- Alternative A provides no westbound access from State Route 58 to Mohawk Street.

In the long term, Alternative A provides the most direct east–west path, and hence, the greatest amount of travel time savings for land uses as they are forecast to exist in year 2038.

Alternative B

Alternative B is more cost-effective than alternative A, but less cost-effective than alternative C or the TSM alternative M.

Near-term benefits are higher than alternative A, because the alignment of alternative B allows for full access to Mohawk Street. While alternative B provides a more direct east–west path than alternative C, the lack of direct access to the Stockdale Highway corridor constrains travel time savings, particularly in the near term. Near-term benefits place alternative B in the middle of the build alternative performance comparison metric and in third place insofar as long-term performance.

Insofar as life-cycle costs, alternative B is less expensive than alternatives A or C; hence, it requires less front end investment. Over time, benefits accrue at a higher pace for both alternative A and alternative C.

Alternative C

Alternative C maintains access to Real Road and thus the Stockdale Highway corridor from westbound State Route 58. This access provides significant benefit compared with build alternatives A and B, particularly with respect to near-term conditions following the opening year in 2018.

A high level of initial benefits coupled with a high level of long-term benefits cause alternative C to yield a higher life-cycle benefit to cost ratio and a shorter payback period compared with alternatives A or C.